

Understanding Backup and Recovery Methods

LESSON

8

EXAM OBJECTIVE MATRIX

SKILLS/CONCEPTS	EXAM OBJECTIVE DESCRIPTION	EXAM OBJECTIVE NUMBER
Understanding Local, Network, and Automated Backup Methods	Understand backup and recovery methods.	6.1
Creating a System Image		
Creating a Repair Disc		
Understanding System Restore	Understand backup and recovery methods.	6.1
Using System Restore		
Understanding Recovery Boot Options	Understand backup and recovery methods.	6.1

KEY TERMS

backup

recovery boot options

restore

restore point

system image

system repair disc

System Restore

Volume Shadow Copy service

Windows Backup

At Interstate Snacks, Inc., management wants to ensure that their users' data is backed up. The IT group has requested that you prepare user training materials to teach employees how to back up and restore their data. You need to learn as much as possible about these technologies to provide accurate materials and in-depth training.

■ Understanding Local, Network, and Automated Backup Methods



THE BOTTOM LINE

With Windows 7, backups are better than ever. In this section, you'll learn about local, manual, and network backups and how to automate them.

CERTIFICATION READY

How are local, online, and automated backups created?

6.1

A **backup** is a properly secured copy of files and folders—and sometimes settings—usually saved in a compressed format. A backup is created so you can **restore** the files and settings in the event of data loss from a hard disk failure, accidental erasure or disk formatting, or natural events. Most users hope they never need backups. When they do need backups, however, they need them *now!* And if they don't have backups, it's often too late—their files might be gone forever.

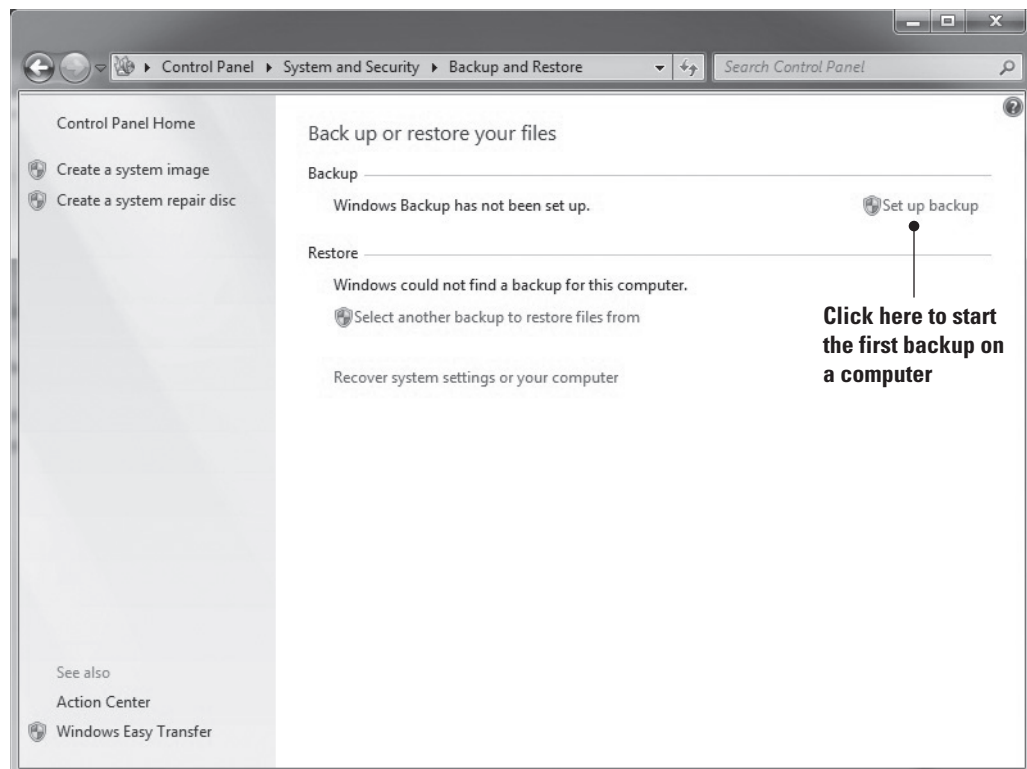
Windows Backup uses the Backup and Restore utility that comes with many Windows versions and enables you to back up and recover files. Windows Backup has been around in one form or another for quite a while. In the past, due to performance issues, many companies and individuals employed third-party backup and restore solutions. With Windows 7, the backup utility is greatly improved over previous Windows editions.

The initial Windows Backup page is shown in Figure 8-1. To begin the first backup on this computer, you would click the *Set up backup* link. Before you learn about backups in depth, there are other system protection features you should know about. The *Create a system image* option located on the upper-left of the page creates a complete backup of your computer. You can use a system image to fully restore a crashed computer. The *Create a system repair disc* option creates a CD or DVD disc you can use to restore your computer if it crashes and no longer boots. You'll learn about system images and creating a system repair disc later in this lesson.

As detailed in Lesson 7, the Action Center link allows you to manage pop-up messages from the system tray and change your User Account Control (UAC) and Windows Update settings

Figure 8-1

The main Windows Backup page



(among other system settings). Windows Easy Transfer (covered in Lesson 1) helps you migrate data and user settings from an old computer.

Windows Backup is designed to back up application data and settings. It does not back up the following:

- Program files, unless part of a system image
- Files stored on a FAT formatted volume
- Files in the Recycle Bin
- Temporary files on drives smaller than 1 gigabyte (GB)
- Files located on other computers across your network (mapped network drives), on the Internet, or on the same drive you are storing the backup; only local files are included in the backup

You can store backups on CD/DVD, to another internal disk, to an external drive, or to a network drive. (Only Windows 7 Professional, Ultimate, and Enterprise editions enable you to back up your files to a network.) If you're using an external drive that's a universal serial bus (USB) drive, you must have enough storage space to store your backup. Tape drives are no longer supported for storage of your backups.

To ensure that your data is protected, you should first create a full backup of your data files and settings. By default, Windows Backup stores incremental changes and appends them to your existing backup when backing up to either a hard drive or a network location. If you back up to CD or DVD, you will have an option to create a new, full backup each time.

Windows Backup is set to run automatically each week, adding new or modified information to your backup file. You can change the default schedule of Windows Backup to a day and time that works best for you, which means a time you're least likely to be working on the computer.

TAKE NOTE *

Although you can back up to an internal disk on the same computer, what happens if your computer crashes or gets damaged in a fire or flood? The purpose of a backup is to have a working copy of data in the worst-case scenario. A best practice is to save the backup to some type of media that's easy to access and store, separate from the computer that contains the original data. If the backup contains critical files, consider saving the backup media in a fireproof cabinet or safe, or in an offsite location. You could store your backup on an internal drive of a server across the network—that's different than saving it to an internal disk on the same computer as the original files.

To perform a backup, you need to be logged on using an account with local or domain administrative permissions, or as a member of the Backup Operators group. Restoring files is different. Even a standard user is able to restore his own data files. An administrator or a member of the Backup Operators group can restore anyone's files as well as the entire system.



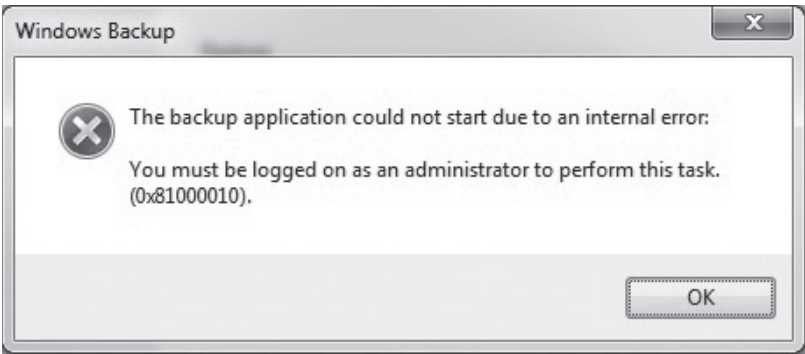
CREATE A BACKUP

GET READY. To create a backup using Windows Backup, perform the following steps:

1. Click **Start**, type **backup** in the **Search programs and files** search box, and then select **Backup and Restore** from the resulting list. Alternately, click **Start > Control Panel** and in the System and Security section, click **Backup your computer**. If prompted for an administrator password or confirmation, type the password or provide confirmation. If you attempt to run the backup utility as a non-administrative account, you can expect to see the error message displayed in Figure 8-2.

Figure 8-2

An error message as a result of attempting to run Windows Backup as a non-administrative user



TAKE NOTE *

If Windows Backup is not enabled, you must turn it on to create backups. Enabling Windows Backup also enables the *Volume Shadow Copy service*, which is what allows you to create restore points and backups of your system.

CERTIFICATION READY

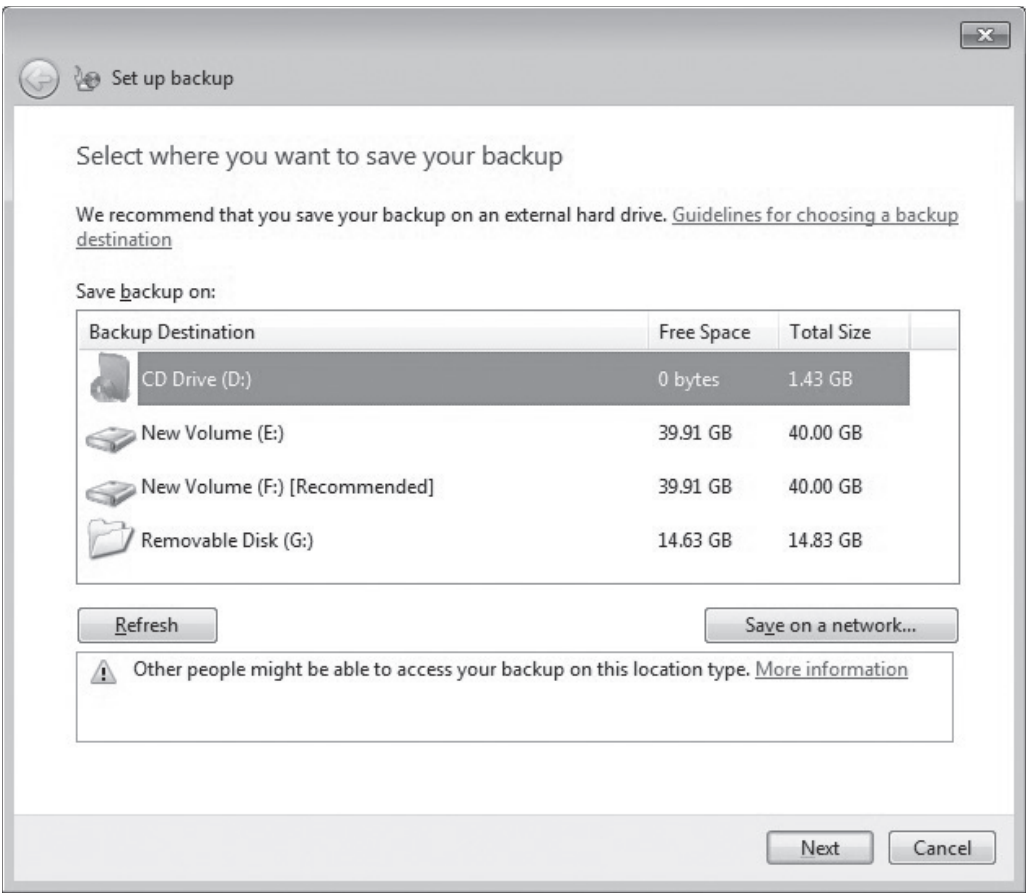
Which options can be selected when creating a backup?

6.1

- 2. If this is the first time you are creating a backup on your computer, click the **Set up backup** link. The backup wizard starts.
- 3. Select where you want to save your backup files. The available types of media you can back up to include CDs/DVDs, internal drives, external drives, USB drives, and network locations (if using Windows 7 Professional, Ultimate, or Enterprise).
 - To store your backup on CD/DVD, an internal drive, or an external drive, select one of the available local backup destinations (see Figure 8-3) and then click **Next**.

Figure 8-3

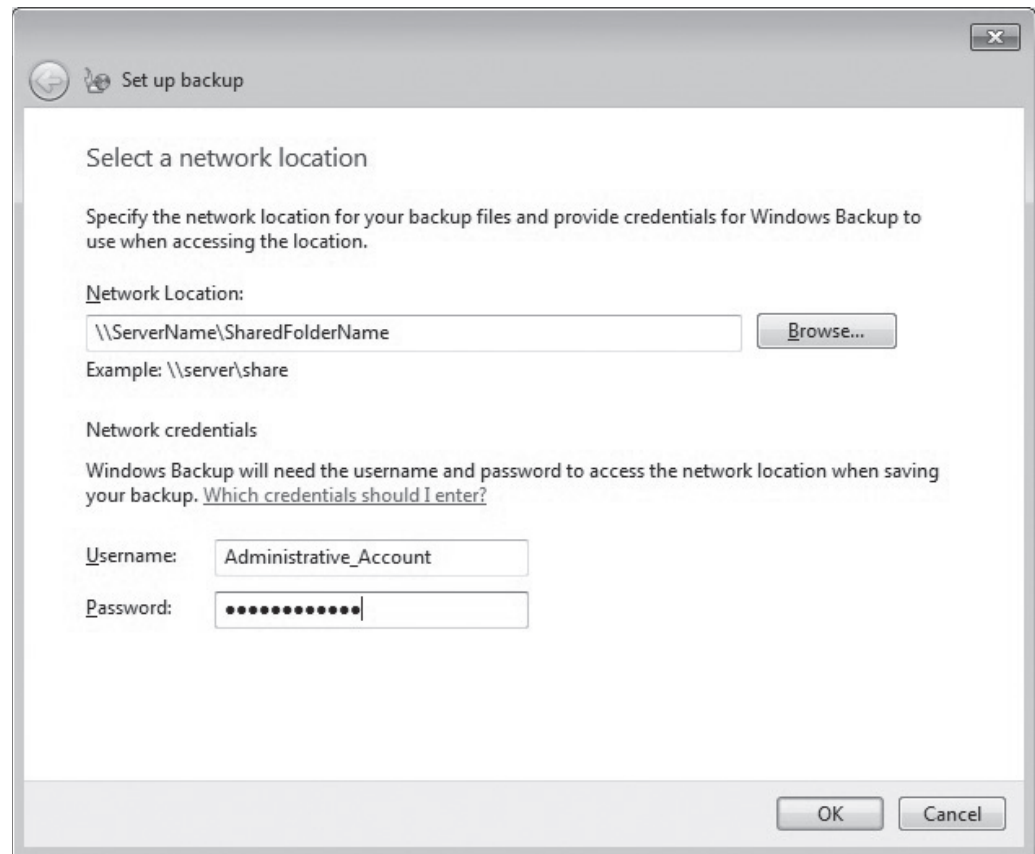
Selecting where to store your backup



- To store your backup on a network drive, click the **Save on a network** button and then click **Next**. On the Select a network location page shown in Figure 8-4, in the **Network Location** text box, type a Universal Naming Convention (UNC) to a shared folder on your network and a **Username** and **Password** that has read/write access to the shared folder you specified in the UNC path. Click **OK**.

Figure 8-4

Storing your backup on the network



4. On the What do you want to back up? page, you have two options:
 - **Let Windows choose (recommended):** Select this to back up the following:
 - All data that is saved in local libraries for all user accounts on the computer.
 - Default Windows folders (including Downloads, AppData, Contacts, Desktop, Favorites, Links, Saved Games, and Searches).
 - A system image. If you are saving your backup to a NTFS-formatted partition and there is enough available disk space for a full system image, the Windows operating system, drivers, installed programs, and registry settings will be included in the backup.
 - **Let me choose:** If you select this option and then click **Next**, you can expand your libraries, drives, and folders to select only what you want to back up (see Figure 8-5). Notice that you cannot expand the folders to back up individual files.

Make your selections and click **Next**.
5. The Review your backup settings page displayed in Figure 8-6 gives you the opportunity to review your choices and to set up a schedule for how often you would like backups to occur. If you leave the default schedule, backups will run **Every Sunday at 7:00 PM**.

TAKE NOTE *

You can back up individual folders, libraries, or drives, but you cannot back up individual files.

Figure 8-5
Choosing what to back up

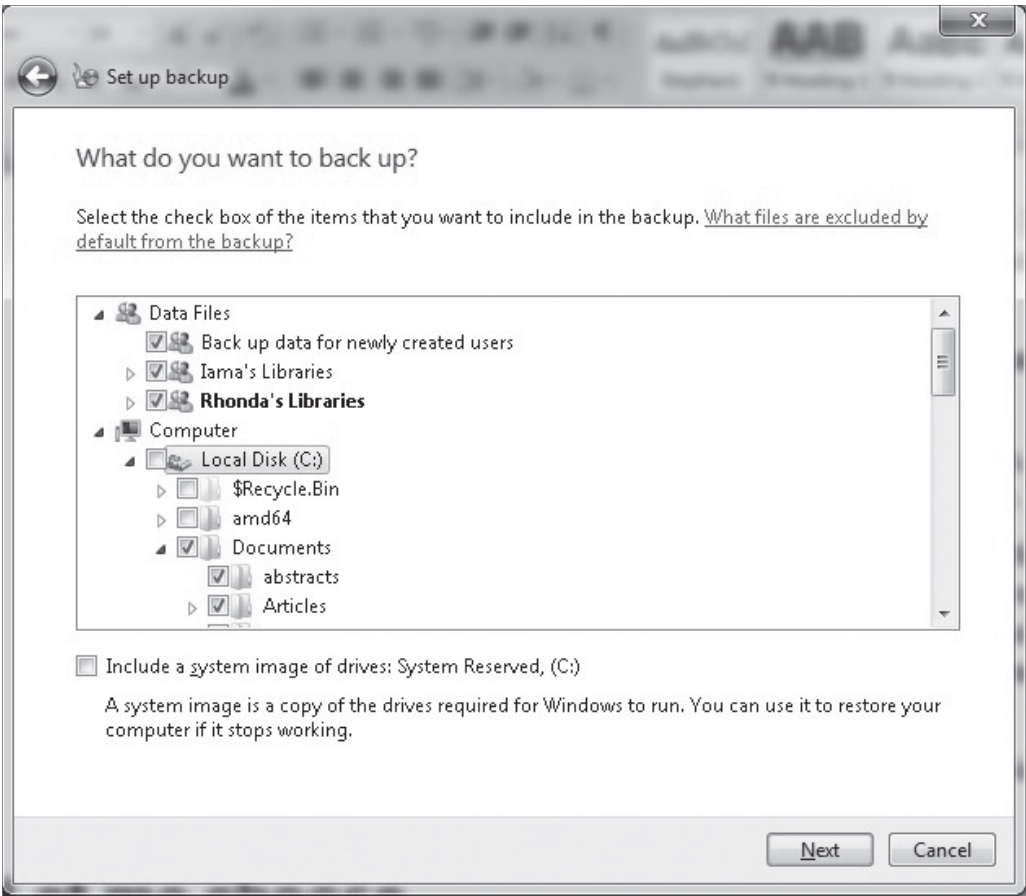
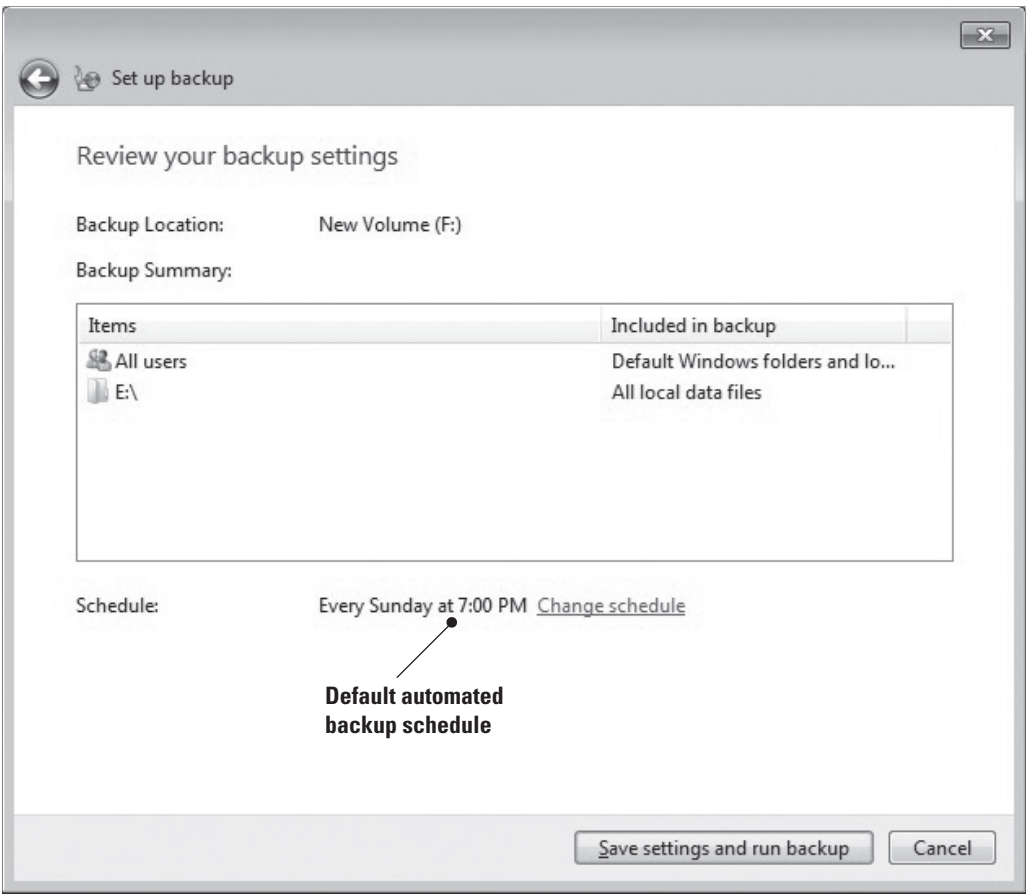


Figure 8-6
Reviewing your backup settings

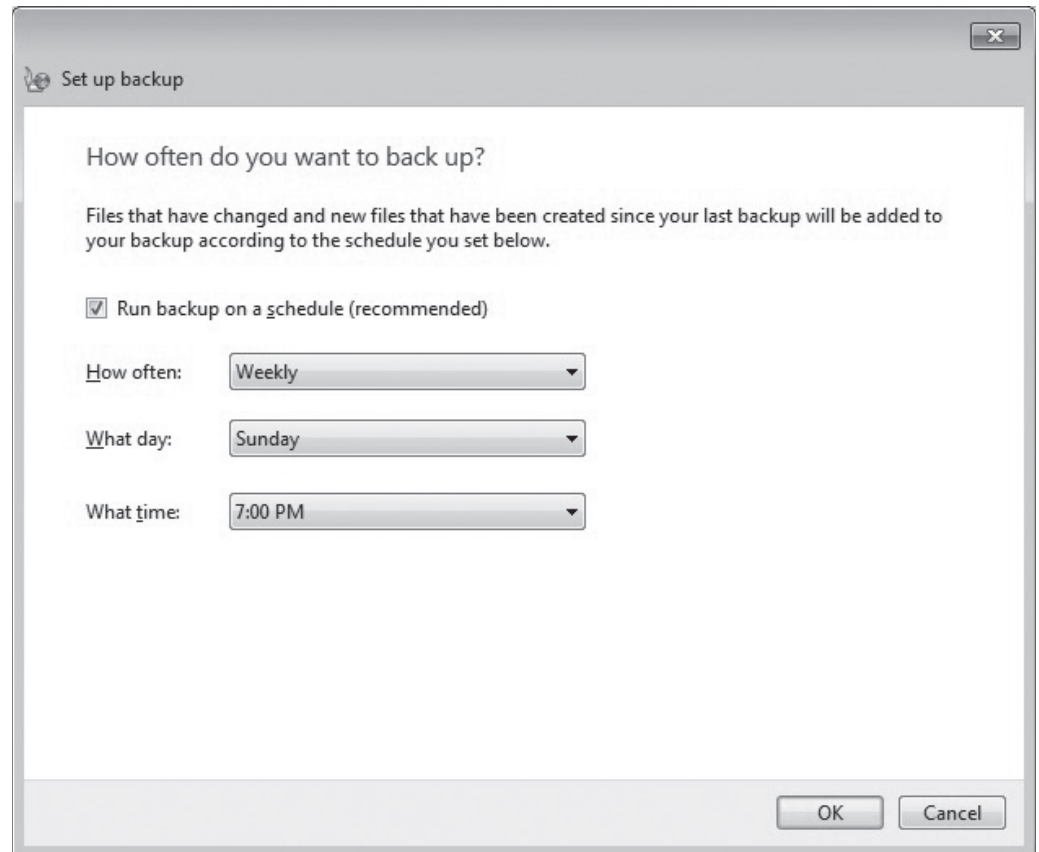


To change the schedule or disable it, click the **Change schedule** link. The How often do you want to back up? page displays (see Figure 8-7):

- To disable scheduled (automatic) backups, deselect the **Run backup on a schedule (recommended)** box.
- To change the schedule, you can change **How often** (**Daily**, **Weekly** or **Monthly**), **What day** (any day of the week), and **What time** (a 24-hour time frame).

After making your selections, click **OK**.

Figure 8-7
Scheduling backups



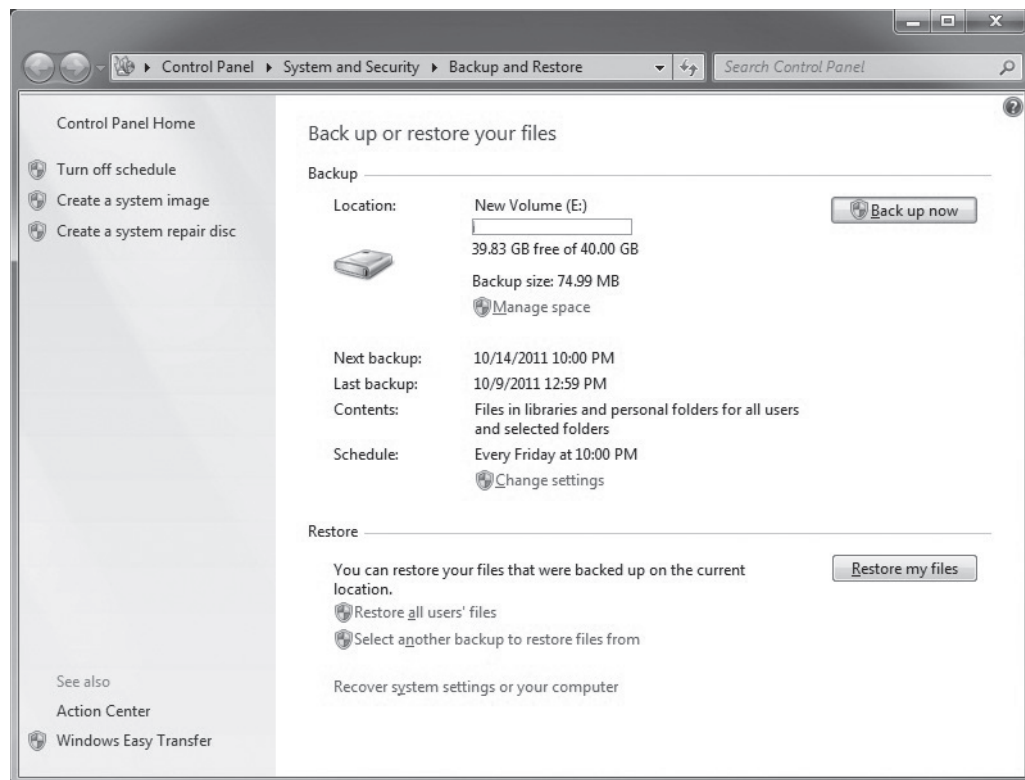
6. On the Review your backup settings page, click **Save settings and run backup.**

After the backup runs, the Back up or restore your files page will look similar to Figure 8-8. Notice that, in this example, the location is set to the E: volume, which currently has 39.83 GB of free space. The backup size is 74.99 MB. And because the schedule was turned on and set to 10:00 PM every Friday night, the next backup is scheduled for the following Friday and every Friday thereafter. The last backup date and time stamp lets you know the last time the backup completed successfully. If you want to change the settings, click *Change settings*. The Set up backup wizard runs again. Using the wizard, you can change your destination to back up to what you want backed up and you can configure the automatic backup schedule.

The *Manage space* link allows you to browse to where your backups are stored. From there you can double-click a backup and then restore it (you will learn more about restores in the next section). You can also view and delete data and system image backups in case you need space for future backups. There are two new options on this page: The *Turn off schedule* link (located in the Control Panel Home section) at the top left of the page and the *Back up now*

Figure 8-8

After backups have run



button (located at the top right of the page). You can create a manual backup anytime by clicking the *Back up now* button.



RESTORE FROM A BACKUP

GET READY. To restore data from a backup using Windows Backup, perform the following steps:

1. Start Windows Backup by clicking **Start**, typing **backup** in the **Search programs and files** search box, and then selecting **Backup and Restore** from the resulting list.
2. If you are logged on as a user with administrative permissions and want to restore another user's data, click the **Restore all users' files** link in the Restore section of the Backup and Restore window (refer to Figure 8-8). If you need to restore files or folders for the administrator account you are logged on as, click the **Restore my files** button. The Browse or search your backup for files and folders to restore page displays (see Figure 8-9).
3. By default, files are restored from the latest backup. To choose an older backup, click the **Choose a different date** link and then select the backup you'd like to restore from.
4. On the right, click the **Search** button if you know the name of the folder or document you're looking for (even part of the name will work).
5. Clicking either **Browse for files** or **Browse for folders** displays Figure 8-10, which at first glance might appear to be the same page, but the behavior is not the same. As you probably guessed, **Browse for files** allows you to browse at the file level so you can restore a specific file. **Browse for folders** allows you to go only to the folder level to restore an entire folder.

TAKE NOTE *

You can select multiple files using the Shift and Ctrl keys. The Shift key enables you to select files that are listed consecutively. The Ctrl key enables you to select non-consecutive files.

Notice also that there are three user accounts data that were backed up: Administrator, Lindsey, and Rhonda. If Lindsey logged on to this same computer,

Figure 8-9
Starting the restore process

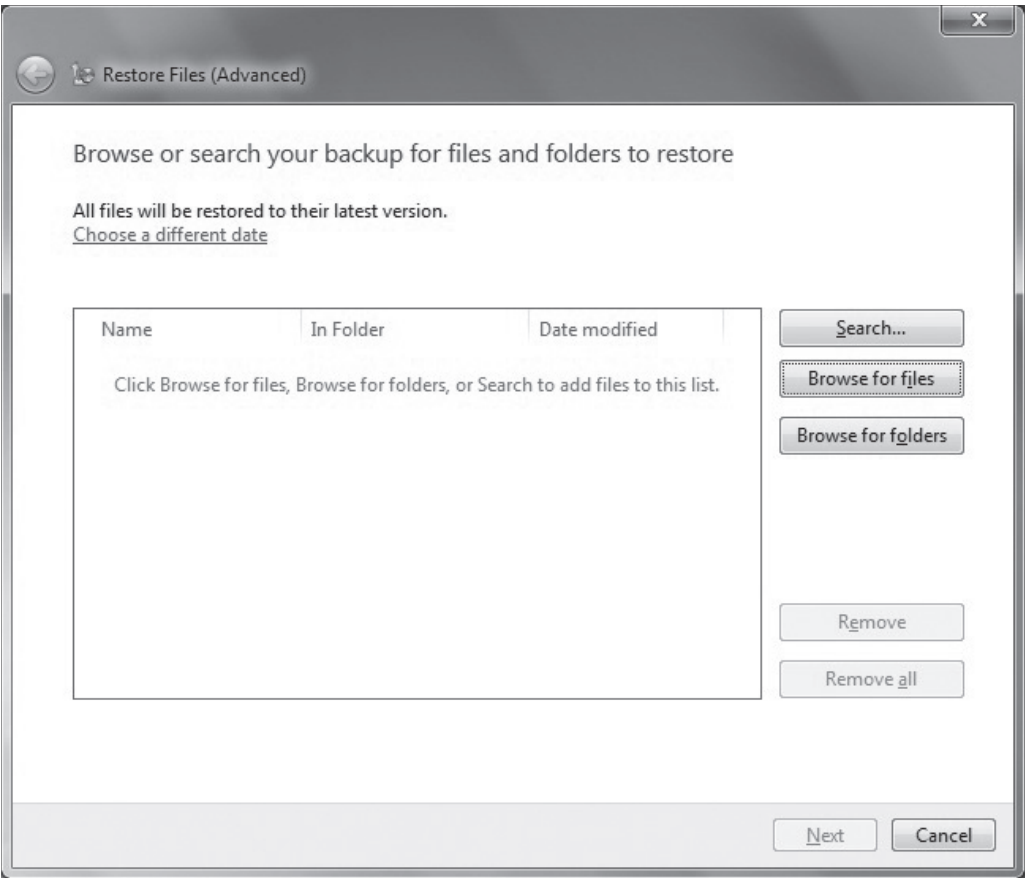
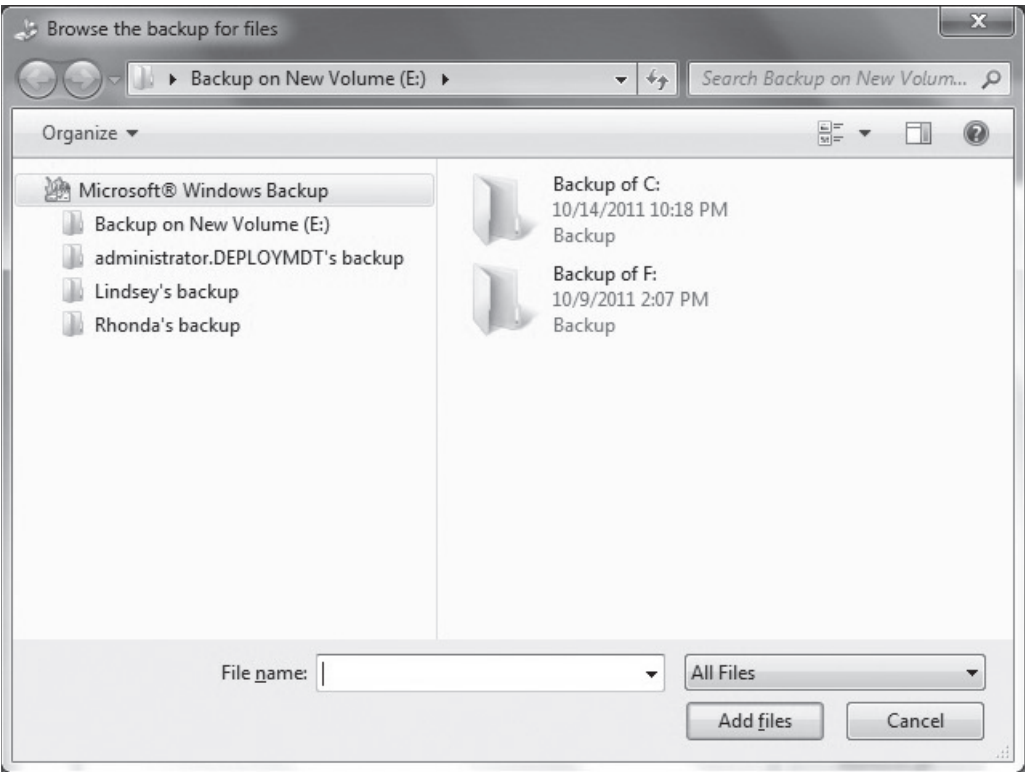


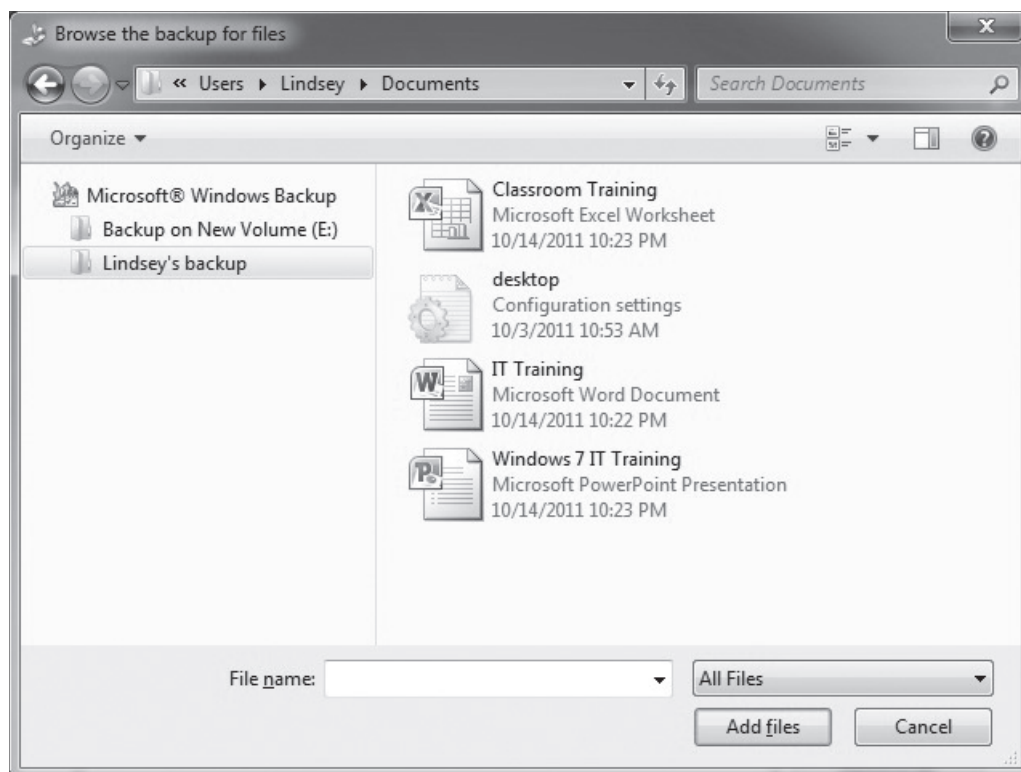
Figure 8-10
Browsing for files and folders



- opened the Backup and Restore utility, and clicked **Restore my files**, Figure 8-11 would display (with her Documents folder expanded).
6. Double-click any file (such as Windows 7 IT Training). When you double-click a file, you perform the same function as when you click the file and then click the **Add files** button.

Figure 8-11

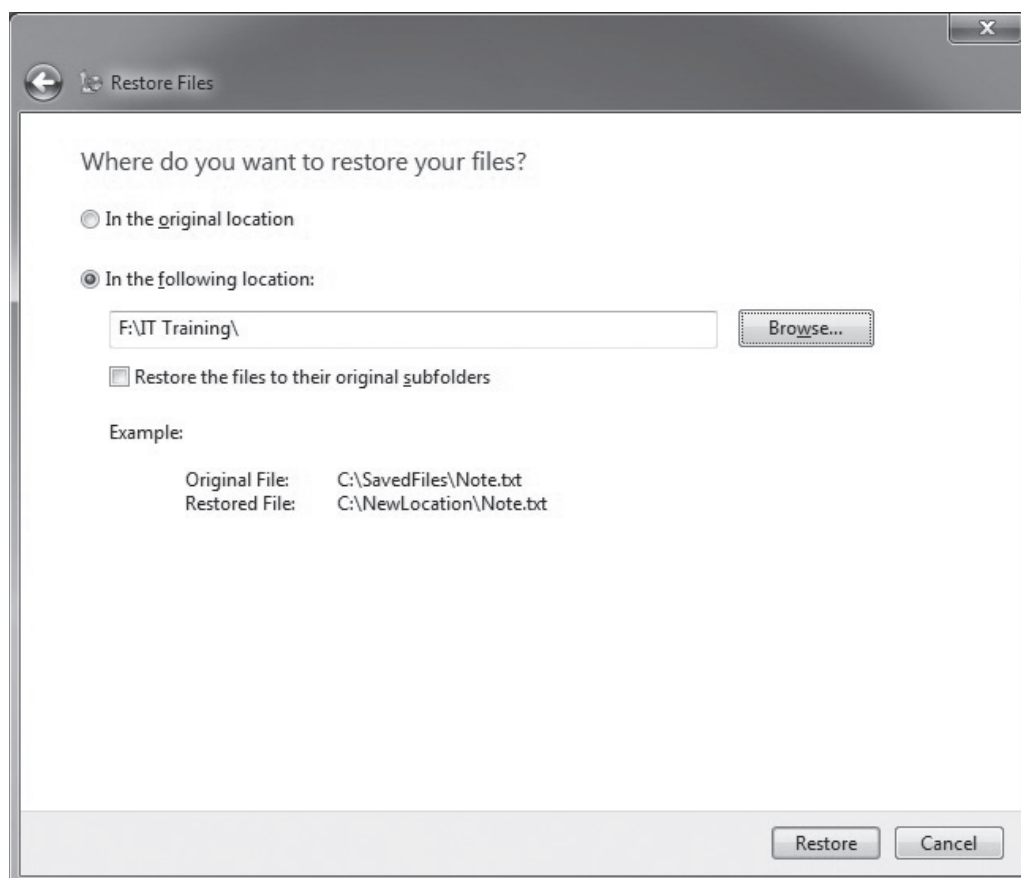
Reviewing a folder backup



7. Select one of the two options displayed in Figure 8-12: **In the original location** or **In the following location**.

Figure 8-12

Choosing where to restore your files



8. Click **Restore**.
9. The Your files have been restored page displays. From this page you can click the **View restored files** link to ensure the correct files were restored to the path you specified.
10. When you have restored your files or folders, click **Finish**.

You can also use the Previous Versions of a file by right-clicking the file and choosing *Restore previous version*. Each time a file is saved with changes, a previous version is created so that you can roll back to an earlier version of a document in case the document becomes corrupted or you just want to view what has changed. If you choose to restore the document, it will be restored to its original location. If you want to restore it to a new location, click the Copy button and browse to the folder where you would like to paste it. The permissions will be inherited from the folder into which you paste the copied file. If you're not sure which version of the file you want to restore, highlight the different versions and click Open to view the contents of each file.

MORE INFORMATION

For more information about Windows 7 Backup and Restore, visit <http://windows.microsoft.com/en-US/windows7/products/features/backup-and-restore>

■ Creating a System Image



THE BOTTOM LINE

A **system image** is an image of an entire hard drive that includes all files needed to restore your operating system. By default, a system image includes the Windows folder, all system settings, programs, and files. If the drive your operating system resides on fails or the computer fails for any reason, you can use a system image on the same machine (replacing the hardware that caused the failure) or another machine to get your users back up and running as quickly as possible.

A system image restore is an all-or-none process. You cannot pick and choose what gets restored, but you can decide to back up more than just a system image if you like.

There are two methods for creating a system image:

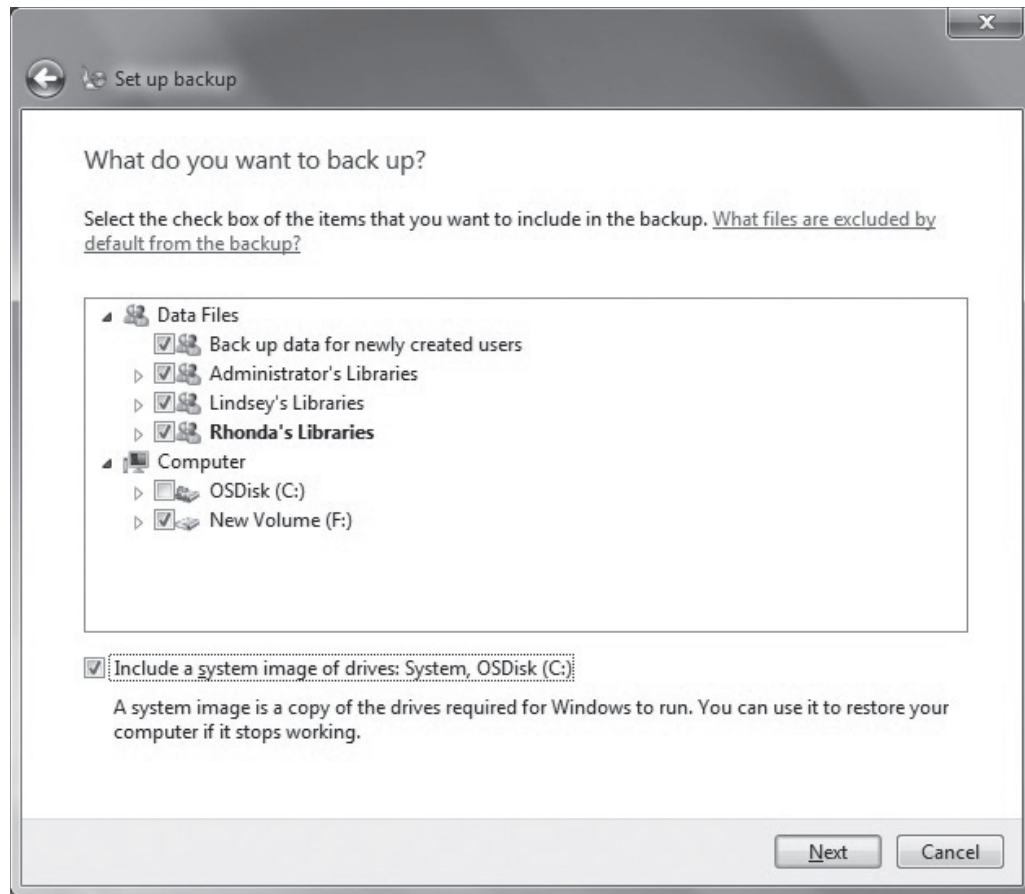
- Creating a system image as part of the automatic Windows Backup process
- Creating a system image manually, which involves running the backup wizard and selecting the drives you want to include in the image

Figure 8-13 shows the backup wizard's What do you want to back up? page (which was previously displayed) with the Include a system image option selected.

You can also click the Create a system image link in the left pane of the Backup and Restore page (refer to Figure 8-8) and then select additional drives or folders for backup on the same page. Just follow the wizard to create your system image.

Figure 8-13

Creating a system image



Creating a system image using the backup wizard enables you to store the system image on a CD/DVD, hard drive, USB drive, or a network location. If you are storing your system images on an internal or external hard drive and you begin to run out of space, older system image backups will be deleted to make room for the new backups. If you are storing your system image backups to a network location, only one is saved. This is because the backup utility creates a folder named `\WindowsImageBackup\` and within that folder each system image backup is named based on the name of the computer storing the system image backup. So each time a new backup is created the old one is overwritten. If you need to save an older system image backup, copy it to a different location and then create the new system image backup.



CREATE A SYSTEM IMAGE

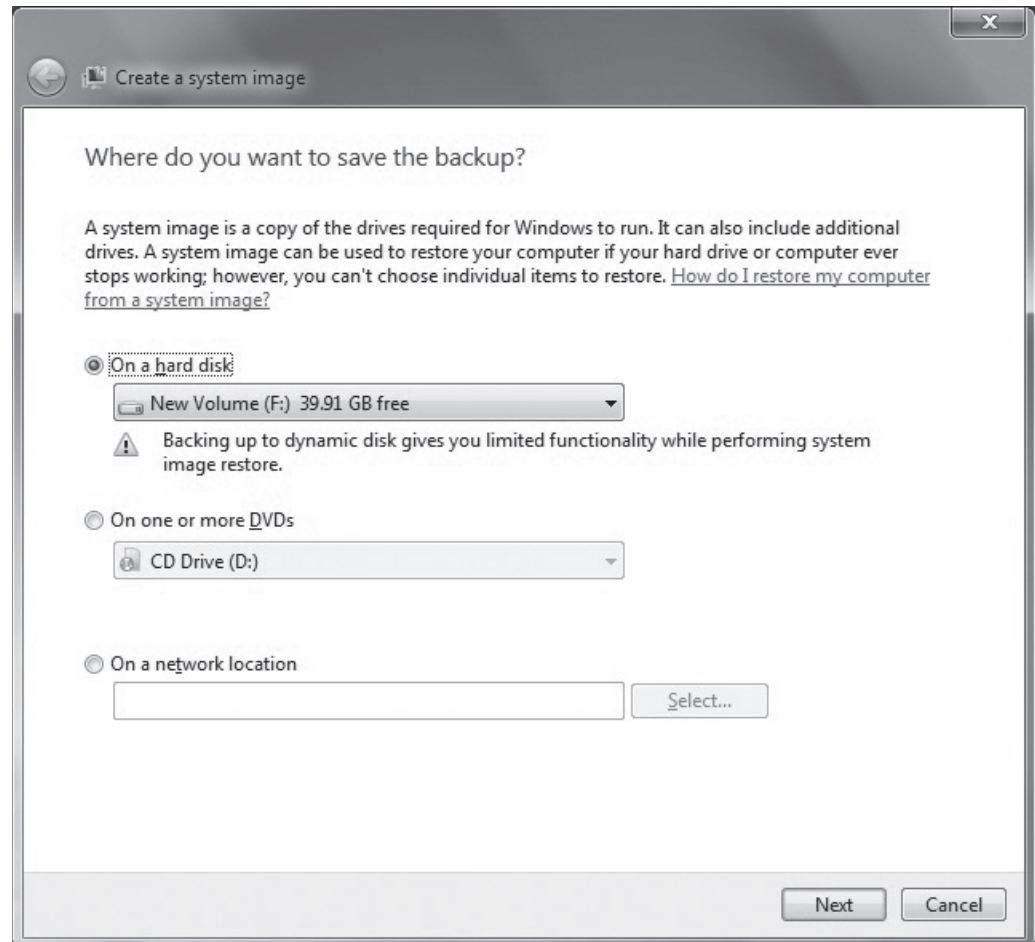
GET READY. To create a system image, perform the following steps:

1. Click **Start**, type **backup** in the **Search programs and files** search box, and then select **Backup and Restore** from the resulting list.
2. On the Backup or restore your files page, in the upper-left corner, click the **Create a system image** link.

3. The backup program scans for available storage devices and displays them on the *Where do you want to save the backup?* page (see Figure 8-14). In this example, the available options are:
 - **On a hard disk.** Click the drop-down arrow to select a disk.
 - **On one or more DVDs.** Click the drop-down arrow to select the CD or DVD drive.
 - **On a network location.** Click **Select** to set your network location UNC path (as you did previously in this lesson).
 Make a selection and click **Next**.

Figure 8-14

Storage choices for a system image



4. The *Which drives do you want to include in the backup?* page displays (see Figure 8-15). The default selections are the **System** drive and the **OSDisk** disk (the disk on which the operating system is installed). This computer has only two other disks: **E:** (where we are storing the image, so we cannot include it here) and **F:** (which is not currently selected). If you want to include the F: drive, select the check box and then click **Next**.
5. On the *Confirm your backup settings* page (see Figure 8-16), review where the backup location will be, how much space the backup will need, and a list of drives that will be included in the backup. If everything looks good, click the **Start backup** button.

Figure 8-15
Selecting drives to include in the system image

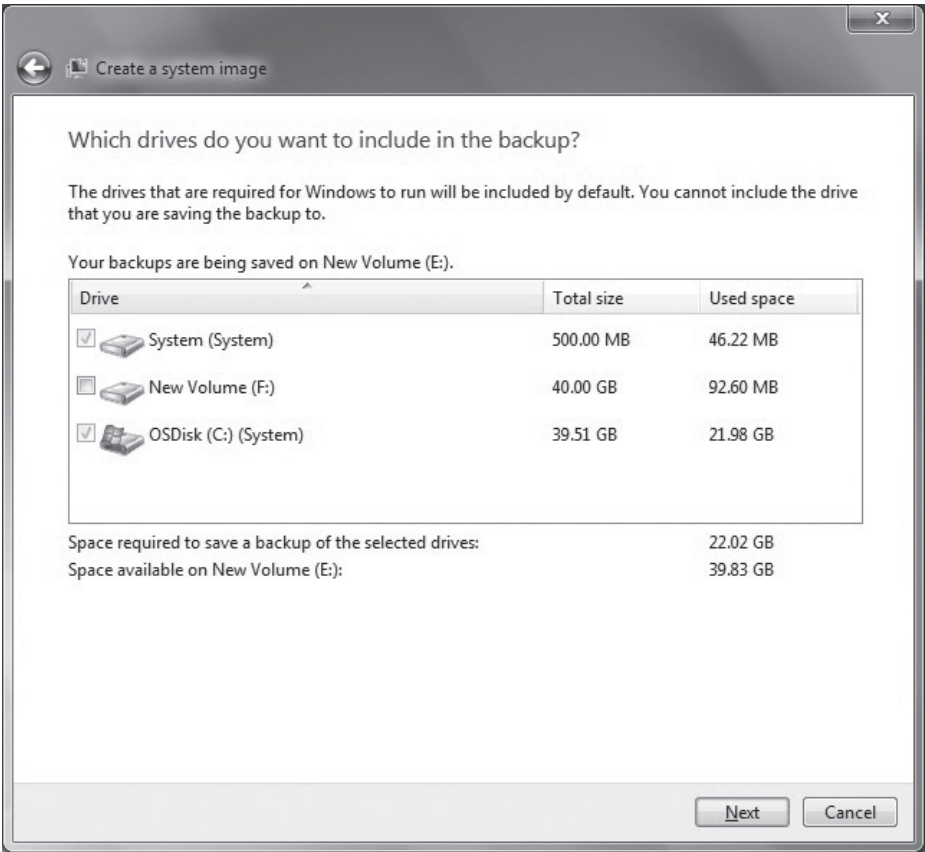
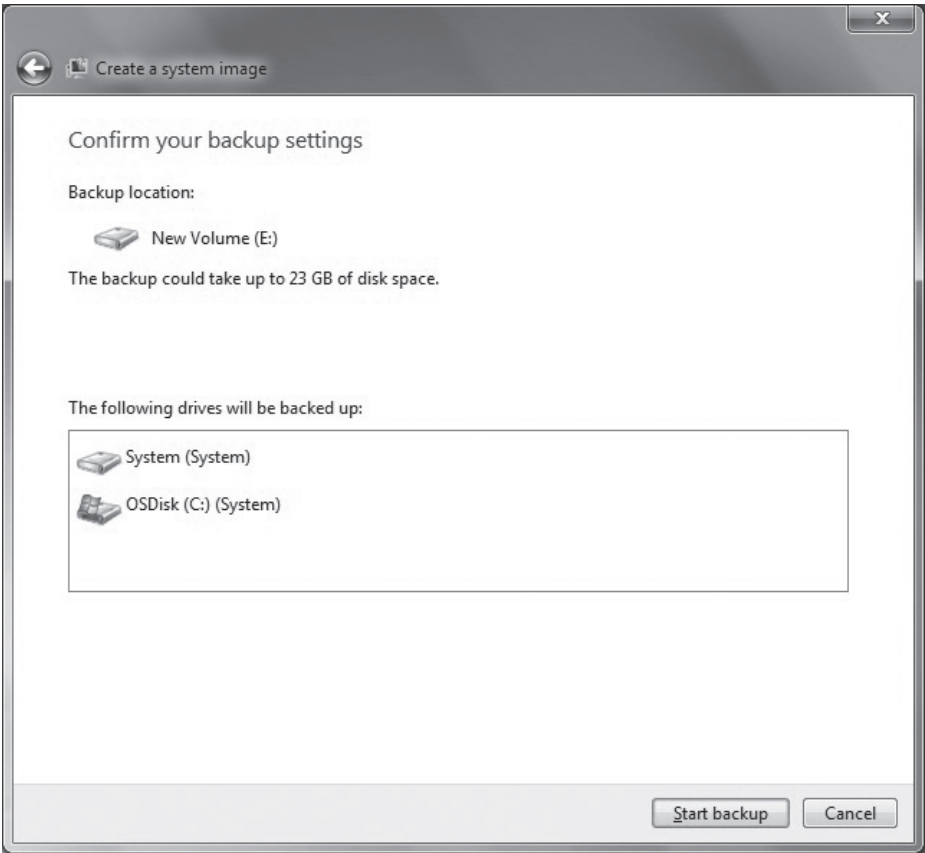


Figure 8-16
Reviewing system image backup settings



+ MORE INFORMATION

For details about system images, go to <http://windows.microsoft.com/en-US/windows7/Back-up-your-programs-system-settings-and-files>

■ Creating a Repair Disc



THE BOTTOM LINE

If your job involves keeping computers up and running, you'll need to be able to repair those systems if the operating system files become corrupted. It's essential for you to have a Windows installation disc or a repair disc on hand. Most organizations today use Microsoft deployment tools to roll out Windows 7, which means that only a few users (if any) will have a Windows installation disc. If that's the case, then creating a repair disc is the next best thing.

When a serious error occurs and you need to restore a system, you'll find the Windows 7 system recovery options to be an invaluable resource. There are two tools that contain the system recovery options:

- The Windows installation disc
- A system repair disc

The Windows installation disc is provided by Microsoft or the computer manufacturer. In some cases, it might be one you created yourself if your organization purchases volume licenses of Windows 7 rather than individual retail copies. A **system repair disc** is a bootable disc you create in Windows 7 that contains Windows system recovery tools. You can use the repair disc to attempt to start a failed computer, or to restore a computer from a system image. In an IT environment, you can create a repair disc for as many technicians as needed.



CREATE A REPAIR DISC

GET READY. To create your own repair disc, perform the following steps:

1. Open Windows Backup by clicking **Start**, typing **backup** in the **Search programs and files** search box, and then selecting **Backup and Restore** from the resulting list.
2. In the task pane on the left, click **Create a system repair disc** (refer to Figure 8-1 and Figure 8-8). If prompted by UAC, type your administrative credentials or click **Continue**.
3. The Create a system repair disc dialog box displays a drop-down list you can click to select a CD/DVD drive. (If only one CD/DVD drive is available on the system, only one option is available and it's already selected.) Click **Create disc**.

Sometimes it is possible that the files needed to create a system repair disc are not available and you might be prompted to insert a Windows installation disc in order to find those files.

■ Understanding System Restore



THE BOTTOM LINE

Restoring a system image is usually necessary because of a computer catastrophe or to get a new computer up and running quickly. If a computer has crashed and you have a spare computer (or you can replace the hardware—such as a drive—that caused the crash), restoring the system image can be a quick fix. When a user gets a new computer and she needs to access all the settings and data from her old computer, restoring a system image can take less time than installing Windows and all applications.

CERTIFICATION READY

How does System Restore help you restore a system?

6.1

Just as there is more than one method for creating system images, there is more than one method for restoring system images. But restoring the system image will restore the entire backup—again, you cannot choose what is restored (it's either restoring everything or it's restoring nothing at all). Before you begin the restore process, ensure that the drive you are restoring the backup to is at least the same size as the drive where you created the system image backup. The drive can be larger; it doesn't have to be the exact size.

There are three methods for restoring a system image:

- Restoring a system image using the Recovery applet in Control Panel
- Restoring a system image using preinstalled recovery options
- Restoring a system image using a Windows installation or system repair disc

If the computer is not experiencing any problems but you need to get a new image on an existing machine, you can use the Recovery applet in Control Panel.



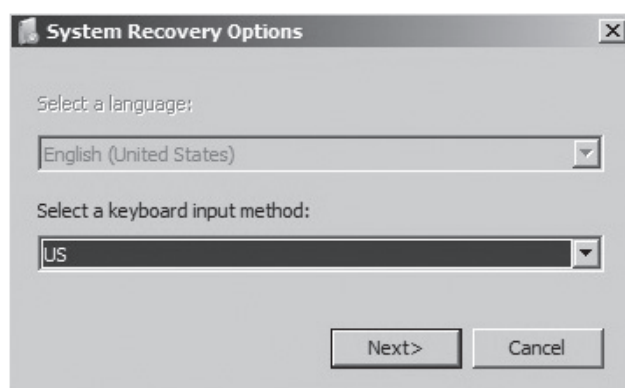
RESTORE A SYSTEM IMAGE

GET READY. To restore a system image, perform the following steps:

1. Open Recovery by clicking **Start** and in the **Search programs and files** search box, typing **recovery** and then selecting **Recovery** from the resulting list.
2. On the Restore this computer to an earlier point in time page, click the **Advanced recovery methods** link.
3. Click **Use a system image you created earlier to recover your computer**.
4. You have the option to create a new backup at this point. Click either the **Back up Now** button or the **Skip** button. (For our purposes, we will click **Skip**.)
5. The computer restarts and boots into a Windows Pre Installation Environment. In the System Recovery Options dialog box (see Figure 8-17), click the drop-down arrow to choose a keyboard layout.

Figure 8-17

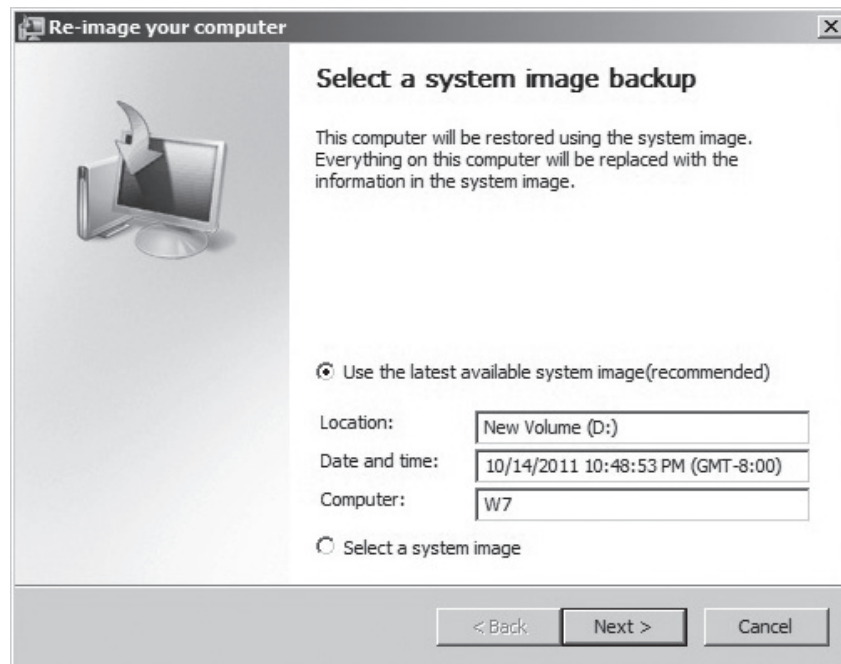
Choosing a keyboard layout



6. The Re-image Your Computer Wizard launches (see Figure 8-18). Leave the default selection of **Use the latest available system image (recommended)**. Choose the **Location**, the **Date and time** of when it was created, and the name of the **Computer** that created it. If this is not the system image you want to restore, you can choose **Select a system image** and then browse to the one you would like to use. After you've chosen your system image to restore from, click **Next**.

Figure 8-18

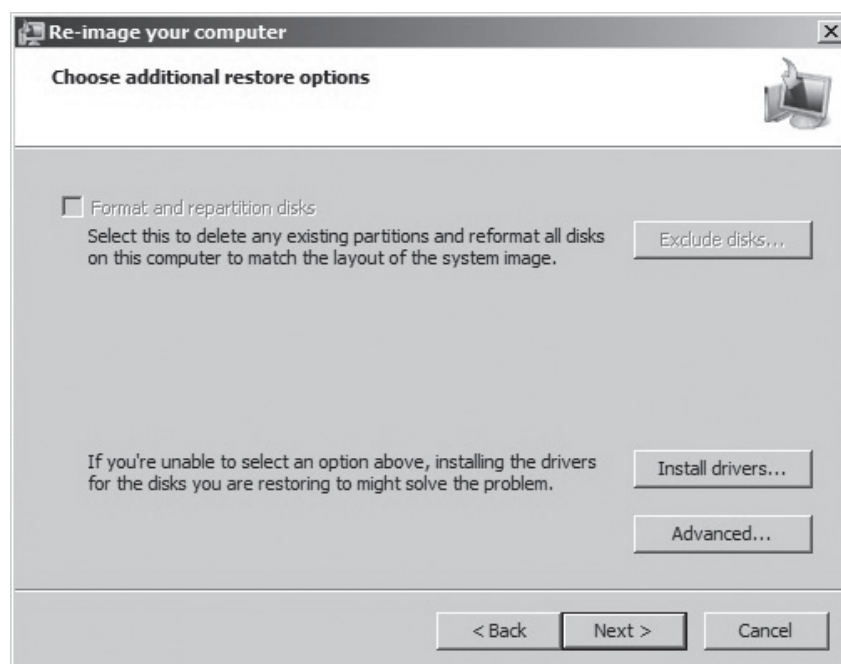
Choosing which system image to restore from



7. Additional restore options are displayed in Figure 8-19. From this page you can format and repartition disks. If the option is grayed out, you might need to install drivers by clicking the **Install drivers** button and then browsing to your mass storage drivers. If you click the **Advanced** button, you can deselect **Automatically restart this computer after the restart is complete** and **Automatically check and update disk error information**. By default, both are selected. Click **Next**.

Figure 8-19

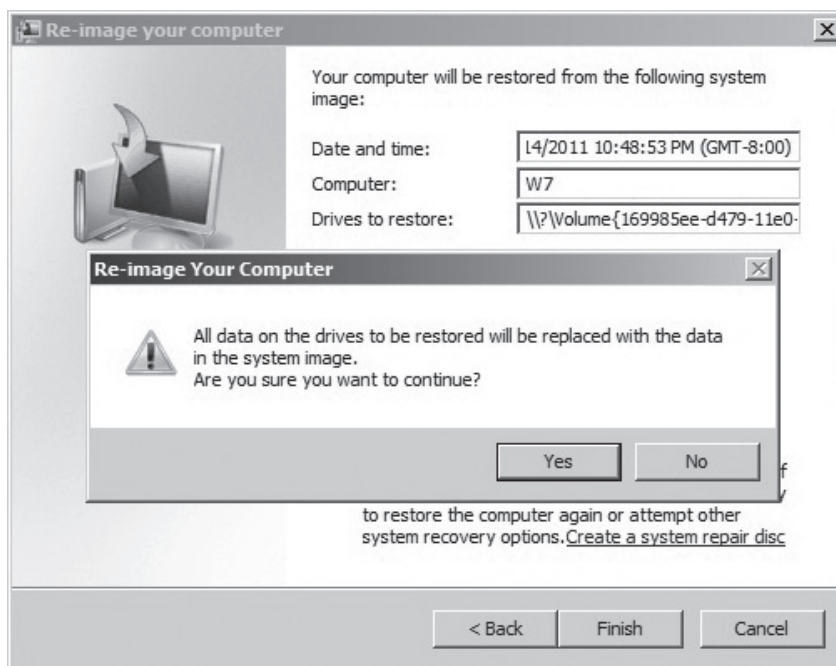
Additional restore options



8. Click **Finish** on the last page to begin the system restore. A warning message displays (see Figure 8-20), prompting you to confirm that you want to replace all data on the drives to be restored. Click **Yes**.

Figure 8-20

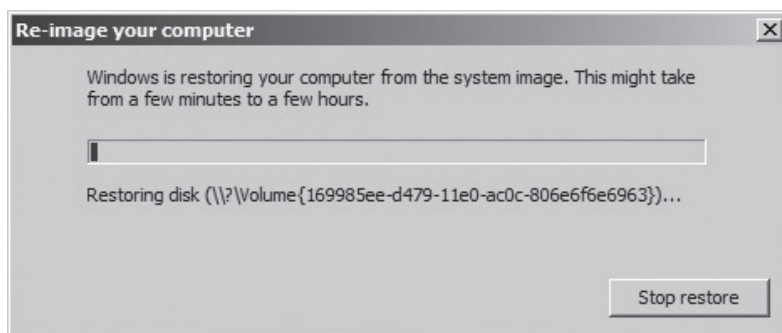
A warning message



9. You can monitor the process of the restore via the progress bar that is displayed (see Figure 8-21). If you need to stop the restore, you can click the **Stop restore** button.

Figure 8-21

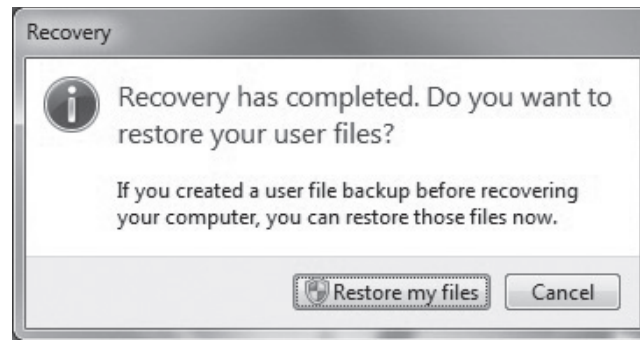
Monitoring the system image restore progress



When the system restore is complete, the computer will boot back into Windows 7 and you'll be prompted to press Ctrl+Alt+Delete to log on. Once you're logged on, a Recovery dialog box (see Figure 8-22) indicates that the recovery has completed. You are provided with the opportunity to also restore your files. Click *Restore my files* or click Cancel, depending on what you want to do.

Figure 8-22

The system image restore completes



If you cannot access the Control Panel, you can restore your computer using a Windows installation disc or a system repair disc (if you have created one), as explained in the following section.



RESTORE USING A WINDOWS INSTALLATION DISC OR A SYSTEM REPAIR DISC

GET READY. To restore your computer using a Windows installation disc or a system repair disc, perform the following steps:

1. With the computer shut down, insert the system repair disc and turn the computer on.
2. If needed, press any key to boot from the system repair disc.
3. Choose your keyboard layout (as previously detailed) and then click **Next**.
4. From the list of Recovery Tools shown in Figure 8-23, click **System Image Recovery**.

Figure 8-23

The System Recovery tools



5. Continue following the wizard prompts as you did earlier in this section.

If you do not have access to the Control Panel and do not have a Windows installation or system repair disc, the next section explains how to restore from the preinstalled recovery options.



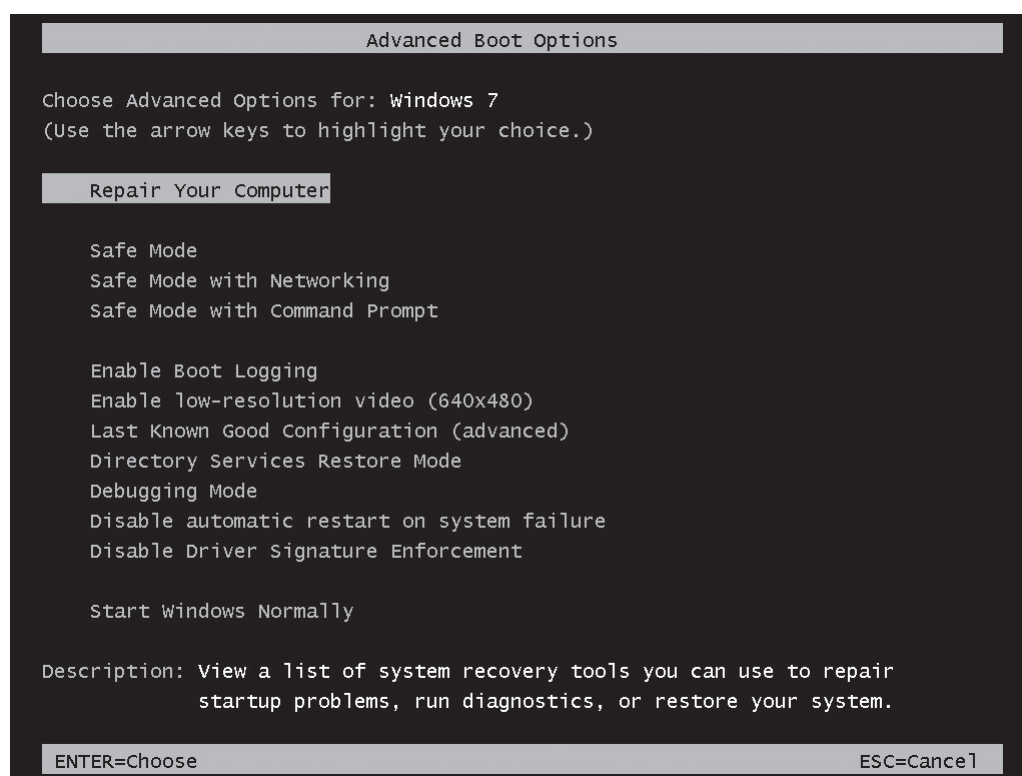
RESTORE FROM THE PREINSTALLED RECOVERY OPTIONS

GET READY. To restore from the preinstalled recovery options, perform the following steps:

1. Shut down the machine (if it's not already shut down) and restart by pressing the power button. During the boot process, and before the Windows logo displays on-screen, press the **F8** key.
2. On the Advanced Boot Options menu screen shown in Figure 8-24, highlight **Repair Your Computer** (using the arrow keys if needed) and then press **Enter**.

Figure 8-24

The Advanced Boot Options page



TAKE NOTE *

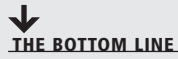
You'll learn more about the Advanced Boot Options later in this lesson.

3. Choose your keyboard layout and then click **Next**.
4. Select a **User name**, type a **Password**, and then click **OK**.
5. On the System Recovery Options menu, click **System Image Recovery** and follow the same steps as you did beginning with Step 6 following Figure 8-18.

TAKE NOTE *

After a system image restore, it is normal for the computer to run slowly for a few hours while Windows checks for and applies updates to things like drivers and antivirus signatures. Opening Microsoft Outlook can also cause a major slowdown because the entire offline cache has to be rebuilt.

■ Using System Restore



If your PC begins experiencing unusual problems that don't clear up after a few reboots or some simple troubleshooting, you can use System Restore to roll back your system files and applications to a time when the PC was working properly.

System Restore uses the System Protection feature to create restore points. **Restore points** can be used to roll back your system to an earlier point in time; they are created automatically on a weekly basis and any time you make a change to your computer (such as installing a new application or device driver). System image backups stored on hard drives can also be used for system restores. Although a system image backup includes data files within the image, when you use the system image backup as a restore point, your data is ignored. To restore your data, you must use the restore feature from the Backup and Restore tool discussed previously in this lesson.

Anytime you are not sure about the potential impact of a change you are making to a computer, you should create a system restore. It is better to have a system restore and not need it than to need one and not have it.



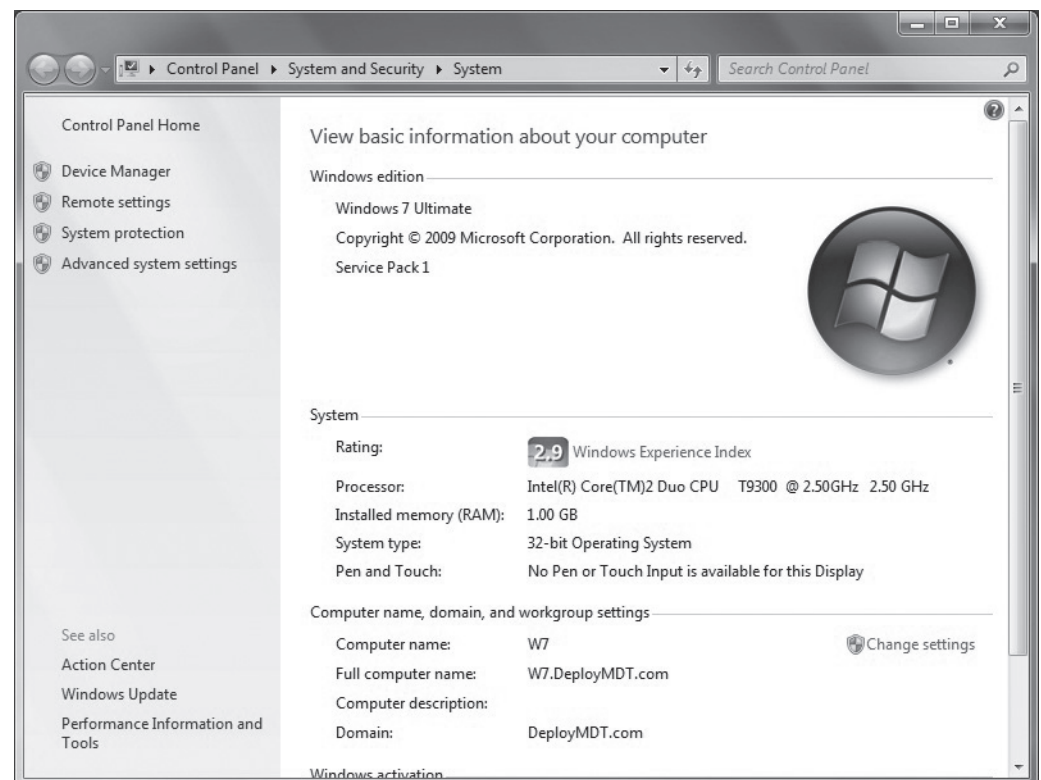
CREATE A SYSTEM RESTORE MANUALLY

GET READY. To create a system restore point manually, perform the following steps:

1. Ensure all open files and applications are saved and closed.
2. Click **Start**, right-click **Computer**, and then click **Properties**. The System page displays (see Figure 8-25).

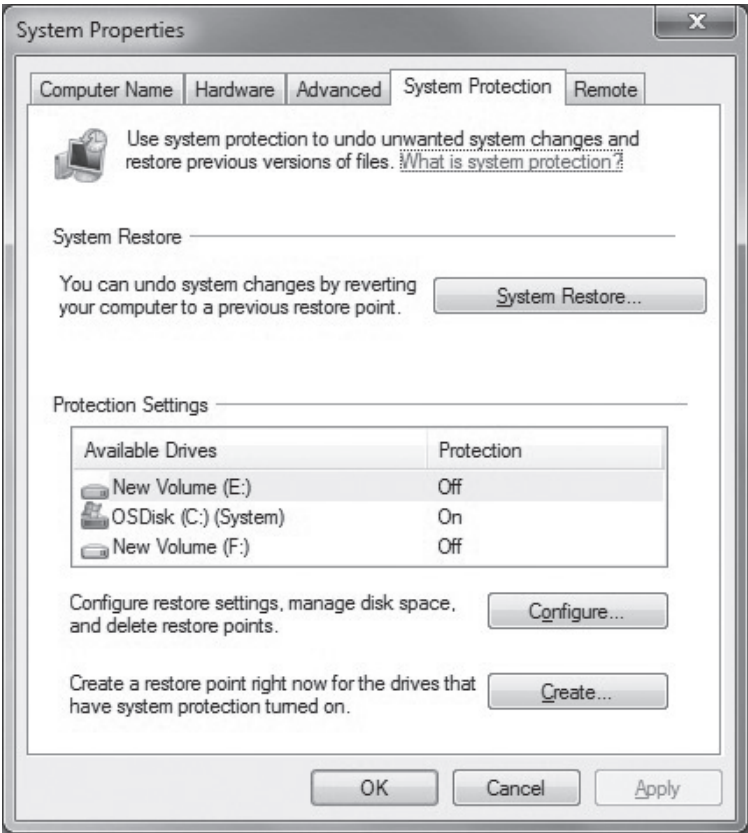
Figure 8-25

The System page



- 3. In the left pane, click **System protection**. If prompted by UAC, type your administrative credentials or click **Continue**.
- 4. The Protection Settings section displays drives on the computer and whether protection is on or off. Protection settings are enabled only on the operating system disk by default. To turn on protection for another drive, highlight the drive and click the **Configure** button (see Figure 8-26).

Figure 8-26
The System Protection tab



- 5. Figure 8-27 shows the Restore Settings for volume E. The default option is selected, which turns off system protection for that drive. You can choose to restore system settings and previous versions of files or you can choose to restore only previous versions of files. You can also adjust the maximum amount of disk space that can be used for system protections. Don't be overly concerned if you begin to run out of space; older system restores are deleted to make room for newer ones.

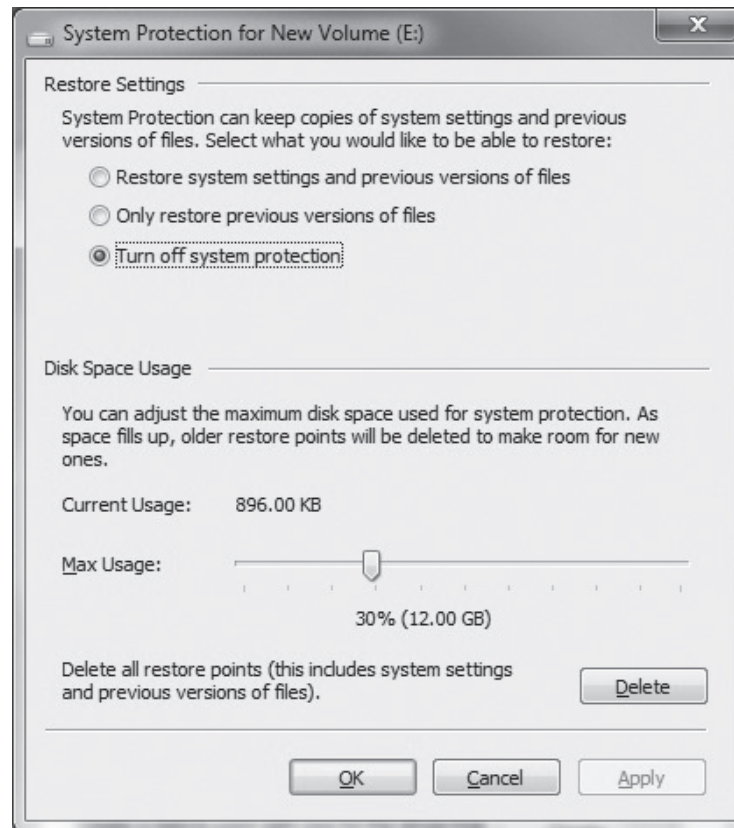
TAKE NOTE *
Turning off system protection deletes all restore points for that disk.

The **Delete** button at the bottom of the Restore Settings page deletes all restore points for that disk. Clicking this button displays a warning alert indicating that you can't undo unwanted system changes or restore previous versions of files on this drive. You are prompted to confirm that you want to continue. Clicking **Continue** deletes them all; clicking **Cancel** cancels the deletion process.

- 6. After configuring your restore settings, click **OK** to return to the System Protection tab.
- 7. Click the **Create** button to create restore points for all drives that have system protection turned on.

Figure 8-27

The Restore Settings for volume E



You now have new restore points for each drive.

Restoring Your System Using System Restores

When you need to utilize a system restore, there are a couple of ways to access them. In the previous section, you skipped the System Restore button on the System Protection tab; by doing so, you can now launch the Restore System wizard.

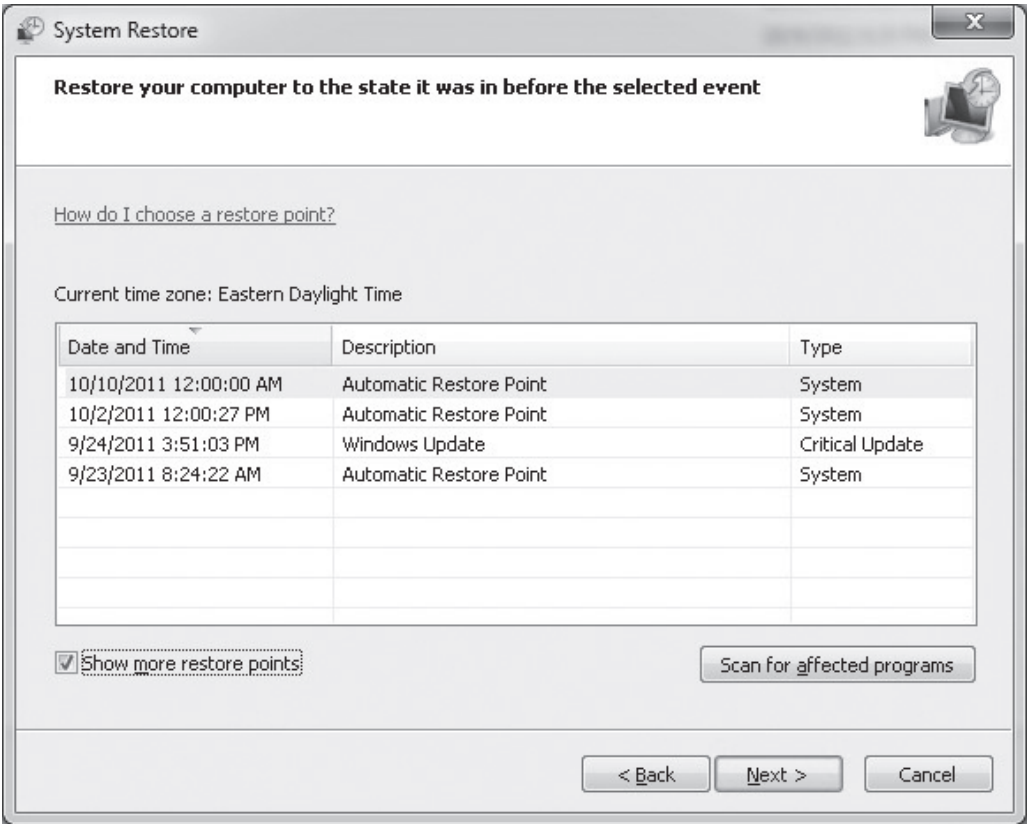


LAUNCH THE RESTORE SYSTEM WIZARD

GET READY. To launch the Restore System Wizard, perform the following steps:

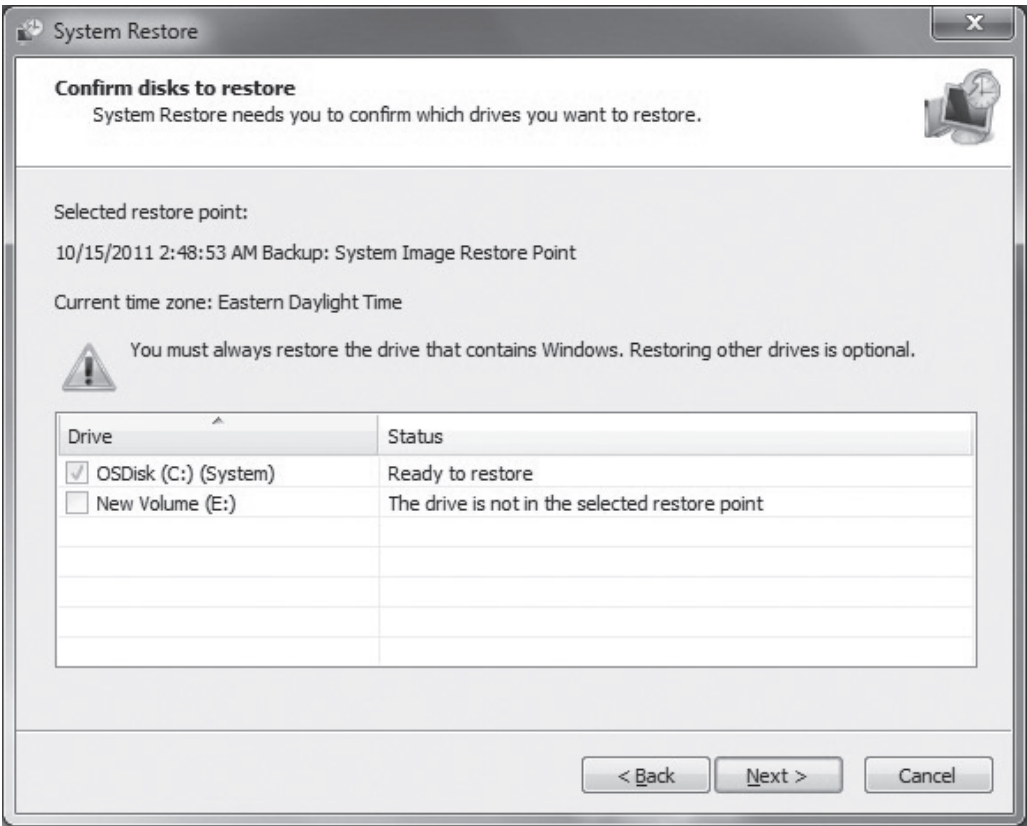
1. Click **Start** and in the **Search programs and files** search box, type **system restore** and then select **System Restore** from the resulting list. The System Restore Wizard starts.
2. On the Restore system files and settings page, click **Next**.
3. System restore automatically recommends the newest restore point to roll back to, but you can select a different restore point by checking the **Show more restore points** option. The descriptions of the restore points that were created automatically are based on the name of the event that triggered the creation of the restore point (see Figure 8-28).
4. Choose the restore point you want to roll back to. If no restore points are displayed, ensure that System Protection is turned on for at least the operating system disk and that there is enough hard drive space. On drives that are 500 MB or larger, you need 300 MB of available disk space; drives smaller than 300 MB need at least 50 MB of free space. You can check to see exactly what would be changed by highlighting the system restore you want to roll back to and clicking the **Scan for affected programs** button. The resulting page displays a list of programs and drivers that will be deleted and the programs and drivers that might be restored if you continue with this system restore.

Figure 8-28
Choosing a restore point



5. On the Confirm disks to restore page (see Figure 8-29), select the disks you would like to restore and then click **Next**. The warning message on this page alerts you to the fact that you must always restore the drive that contains Windows. Restoring others drives are optional.

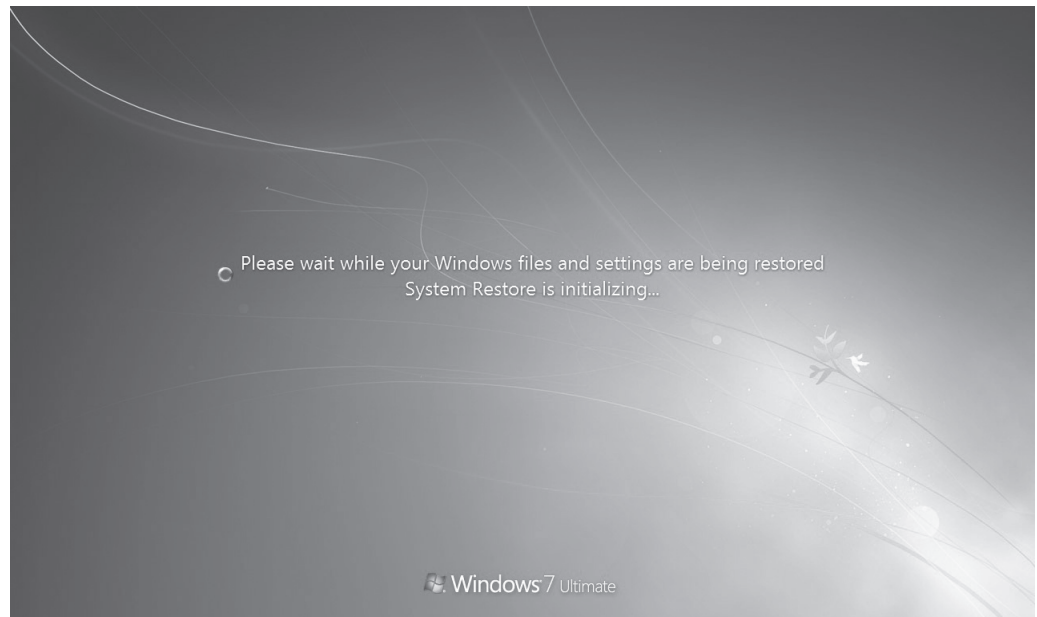
Figure 8-29
Confirming disks to restore



6. Ensure all files and applications are saved and closed. On the Confirm your restore point page, click **Finish**. Figure 8-30 shows System Restore initializing.

Figure 8-30

System Restore initialization



During this process, you will see the registry restored, temporary files deleted, and then Windows restarts. When the system restore is completed, an informational message displays, stating the system restore completed successfully. The system has been restored to the restore point you chose, and your documents have not been affected.

7. Click **Close** to end the system restore.

What happens if the system restore not only doesn't fix your issue, it makes it worse? If you can still boot the computer, you can go through the same process again and choose an earlier restore point to roll back to (if you have one). Or if you prefer, you can open System Restore, choose Undo System Restore, and then click Next. Review your choices and then click Finish.

If you would rather wipe your computer clean of all data and applications—which really should be only a last-ditch effort when every other solution fails—perform an advanced recovery.



PERFORM AN ADVANCED RECOVERY

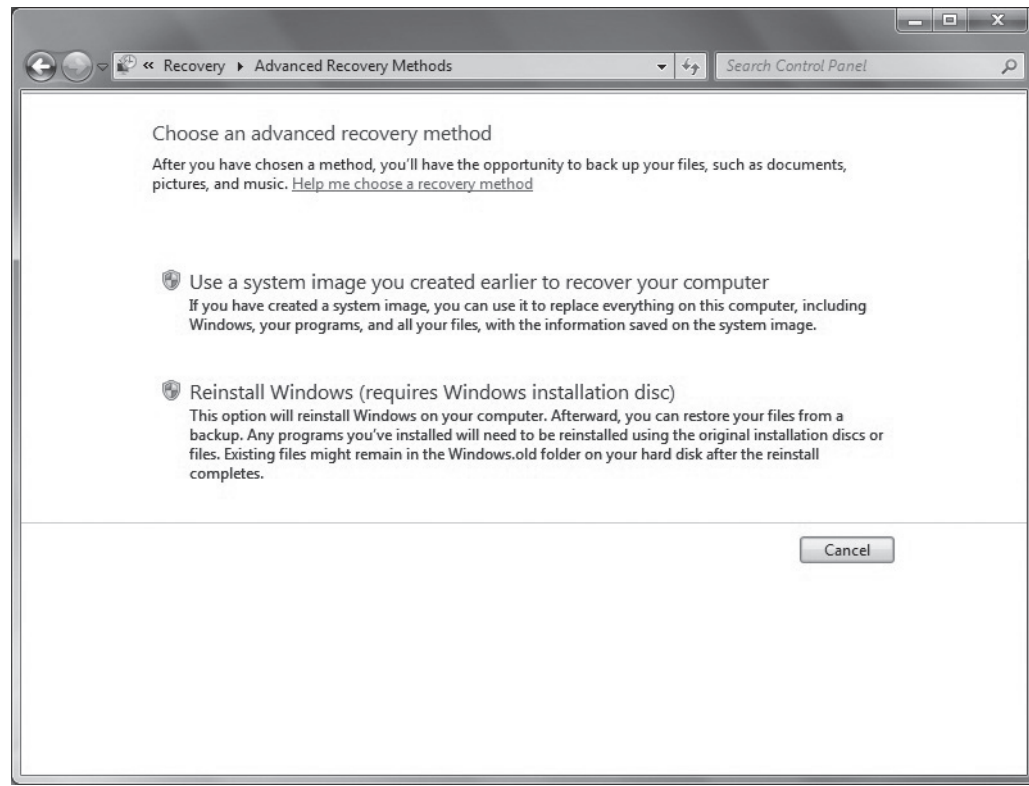
GET READY. To perform an advanced recovery, perform the following steps:

1. Click **Start**, type **recovery** in the **Search programs and files** search box, and then select **Recovery** from the resulting list.
2. On the Restore this computer to an earlier point in time page, click the **Advanced recovery methods** link.
3. The Choose an advanced recovery method page (see Figure 8-31) displays two options:
 - **Use a system image you created earlier to recover your computer.** Choose this option if you have a system image; this option re-installs your applications and system settings. If you do not have a system image backup, choose the Reinstall Windows option.

- **Reinstall Windows (requires Windows installation disc).** This option sets the machine back to ground zero (before you installed any applications or created any folders/files). If you have a backup, you can reinstall Windows and then restore your files from a backup.

Figure 8-31

Choosing the advanced recovery method



+ MORE INFORMATION

To learn more about System Restore, visit <http://windows.microsoft.com/en-US/windows7/products/features/system-restore>

■ Understanding Recovery Boot Options



THE BOTTOM LINE

You might think if your computer doesn't boot, a restore or reinstallation must be done. But that is not always the case. There are some built-in recovery boot options you can try if your computer no longer boots.

CERTIFICATION READY

How are recovery boot options used to repair a Windows 7 installation?

6.1

Recovery boot options, also referred to as advanced startup options, provide you with tools to help you repair a broken Windows 7 installation. The options are found on the Advanced Boot Options page, which you access when the computer first begins to boot by pressing the F8 key. (You must press the F8 key before Windows begins to load.)

The following list explains each tool:

- **Repair Your Computer:** This tool is helpful when your computer will not boot due to corrupt or missing system files. In the event of missing or corrupt system files, this tool should begin working automatically. If you still suspect system files causing the problem, run this tool manually from the Advanced Boot Options menu. This option is not designed to repair hard drives or memory issues and it doesn't provide backups. Files used

CERTIFICATION READY

What is Safe Mode and how can you use Safe Mode options to start a computer?

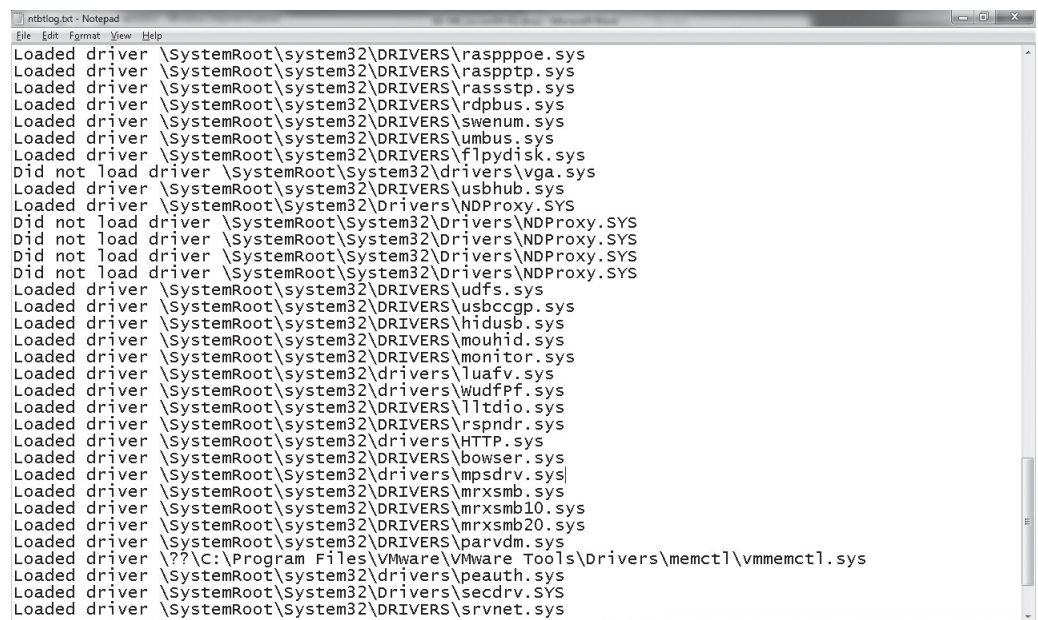
6.1

to repair your system files are stored on a Windows 7 Recovery partition. This partition is created by default and is a hidden partition, so you won't see it in Windows Explorer. However, if you open the disk management snap-in, you will see a partition with the label System Reserved and it will be 100 MB.

- **Safe Mode:** This tool starts Windows 7 in a limited state that loads only basic files and drivers. If you have recently installed an application and now your computer will not boot, you can start the machine in Safe Mode and then run the new application. If the application runs in Safe Mode, then it's likely that a .dll file or driver was installed by the application and it might be conflicting with OS drivers or .dll files. Tools that help you diagnose or resolve issues when in Safe Mode include System Recovery (to use a restore point), Control Panel, Device Manager, Event Viewer, System Information, and Registry Editor (to edit the registry).
- **Safe Mode with Networking:** This tool provides you with access to the standard Safe Mode options but also loads networking drivers so you can access resources on the network or the Internet. Avoid using this option if you are trying to repair the damage done by a virus because, in some cases, the infection can spread to network resources.
- **Safe Mode with Command Prompt:** Starts Windows Safe Mode, giving you everything from Safe Mode except the graphical interface so the only interface you will have is a command prompt. This is an advanced recovery mode, but it is useful for repairing systems on which the graphical user interface has corrupted.
- **Enable Boot Logging:** This tool boots Windows into a normal mode and creates a text file that lists all drivers loaded (or not loaded) during startup. The file will be named nbtlog.txt and stored in the C:\Windows folder (or whichever drive you installed Windows on). The contents will look similar to Figure 8-32.

Figure 8-32

Drivers loaded during the boot process



```

nbtlog.txt - Notepad
File Edit Format View Help
Loaded driver \SystemRoot\system32\DRIVERS\raspppoe.sys
Loaded driver \SystemRoot\system32\DRIVERS\raspppt.sys
Loaded driver \SystemRoot\system32\DRIVERS\rassstp.sys
Loaded driver \SystemRoot\system32\DRIVERS\rdpbus.sys
Loaded driver \SystemRoot\system32\DRIVERS\swenum.sys
Loaded driver \SystemRoot\system32\DRIVERS\umbus.sys
Loaded driver \SystemRoot\system32\DRIVERS\flpydisk.sys
Did not load driver \SystemRoot\System32\drivers\vga.sys
Loaded driver \SystemRoot\system32\DRIVERS\usbhub.sys
Loaded driver \SystemRoot\System32\Drivers\NDProxy.SYS
Did not load driver \SystemRoot\System32\Drivers\NDProxy.SYS
Did not load driver \SystemRoot\System32\Drivers\NDProxy.SYS
Did not load driver \SystemRoot\System32\Drivers\NDProxy.SYS
Did not load driver \SystemRoot\System32\Drivers\NDProxy.SYS
Loaded driver \SystemRoot\system32\DRIVERS\udfs.sys
Loaded driver \SystemRoot\system32\DRIVERS\usbccgp.sys
Loaded driver \SystemRoot\system32\DRIVERS\hidusb.sys
Loaded driver \SystemRoot\system32\DRIVERS\mouhid.sys
Loaded driver \SystemRoot\system32\DRIVERS\monitor.sys
Loaded driver \SystemRoot\system32\drivers\luafl.sys
Loaded driver \SystemRoot\system32\drivers\wudfpp.sys
Loaded driver \SystemRoot\system32\DRIVERS\lltdio.sys
Loaded driver \SystemRoot\system32\DRIVERS\rsppndr.sys
Loaded driver \SystemRoot\system32\drivers\HTTP.sys
Loaded driver \SystemRoot\system32\DRIVERS\browser.sys
Loaded driver \SystemRoot\System32\drivers\mpsdrv.sys
Loaded driver \SystemRoot\system32\DRIVERS\mrxsm.sys
Loaded driver \SystemRoot\system32\DRIVERS\mrxsm10.sys
Loaded driver \SystemRoot\system32\DRIVERS\mrxsm20.sys
Loaded driver \SystemRoot\system32\DRIVERS\parvdm.sys
Loaded driver \C:\Program Files\VMware\VMware Tools\Drivers\memctl\vmemctl.sys
Loaded driver \SystemRoot\system32\drivers\peauth.sys
Loaded driver \SystemRoot\System32\Drivers\secdrv.SYS
Loaded driver \SystemRoot\System32\DRIVERS\srvice.sys
  
```

- **Enable Low-resolution Video (640x480):** This tool boots Windows normally but changes the resolution to 640x480 and lowers the refresh rate. If you suspect your video driver is misbehaving, choose this option to help lower the resolution and refresh rate to one that almost every driver out there can display properly. The drivers are tied to the actual monitor, so only install drivers for your specific type of video adapter.
- **Last Known Good Configuration (Advanced):** This tool boots from the last configuration that was known to work. When Windows shuts down successfully, system

settings are saved in the registry. If you cannot restart your computer, you can choose to load the last known good configuration, which will load the system settings from the registry for the last time the machine booted properly. If you added new drivers or made changes to the registry and the computer no longer boots, those changes won't be included when you use the Last Known Good Configuration (Advanced) option.

- **Directory Services Restore Mode:** This tool is used only on domain controllers (DC), allowing administrators to repair Active Directory settings on a DC that is having issues.
- **Debugging Mode:** This tool starts Windows in an advanced debugging mode.
- **Disable Automatic Restart on System Failure:** If Windows encounters an error during the boot process, the automatic restart on system failure feature tells Windows to restart again. If your computer attempts to restart but cannot, and then it begins to restart again and again, this tool stops the loop behavior.
- **Disable Driver Signature Enforcement:** This tool allows you to install drivers that are not signed properly.
- **Start Windows Normally:** This tool simply starts Windows normally. Use this option if you have used a tool that returns you to the main Advanced Options Menu and you're ready to start Windows normally.



ACCESS THE RECOVERY BOOT OPTIONS

GET READY. To access the recovery boot options, perform the following steps:

1. With your computer powered down, restart by pressing the power button. (If, however, your screen is displaying blue, power off the computer, wait a minute, and then power it back on.) As soon as you see anything display on your screen during the boot process, press and hold the **F8** key or press the **F8** key repeatedly. If you don't press the **F8** key quickly enough, you might have to shut the machine down and power it on again to get another chance to press the **F8** key.
2. The Advanced Boot Options screen displays (see Figure 8-24, previously). To select an option, use the arrow keys to move up and down. When you have highlighted the tool you want to use, press **Enter**.

If for some reason you cannot boot the machine to the Advanced Boot Options menu, you can also get these tools from a Windows installation disc.

+ MORE INFORMATION

For more information about the Advanced Boot Options, go to <http://windows.microsoft.com/en-US/windows7/Advanced-startup-options-including-safe-mode>

SKILL SUMMARY

IN THIS LESSON YOU LEARNED:

- A backup is a properly secured copy of files and folders—and sometimes settings—usually saved in a compressed format. A backup is created so you can restore the files and settings in the event of data loss from a hard disk failure, accidental erasure or disk formatting, or natural events.
- Windows Backup uses the built-in Backup and Restore utility to enable you to back up and recover files.
- A system image is an image of an entire hard drive that includes all files needed to restore your operating system. By default, a system image includes the Windows folder, all system settings, programs, and files.

- If the drive your operating system resides on fails or the computer fails for any reason, you can use a system image on the same machine (replacing the hardware that caused the failure) or another machine to get the computer back up and running as quickly as possible.
- The Windows installation disc is provided by Microsoft or the computer manufacturer. You can create your own Windows installation disc if your organization purchases volume licenses of Windows 7 rather than individual retail copies.
- A system repair disc is a bootable disc you create in Windows 7 that contains Windows system recovery tools. You can use the repair disc to attempt to start a failed computer, or to restore a computer from a system image.
- Restoring a system image is usually necessary because of a computer catastrophe or a new computer. If a computer has crashed and you have a spare computer or a replacement hard disk, you can simply restore the system image. You can also restore an image to a new computer as a quick way to install the system.
- If your PC begins experiencing unusual problems that don't clear up after a few reboots or some simple troubleshooting, you can use System Restore to roll back your system files and applications to a time when the PC was working properly.
- System Restore uses the System Protection feature to create restore points. Restore points can be used to roll back your system to an earlier point in time; they are created automatically on a weekly basis and any time you make a change to your computer (such as installing a new application or device driver).
- Recovery boot options, also referred to as advanced startup options, provide you with tools to help you repair a broken Windows 7 installation. The options are found on the Advanced Boot Options menu, which you access when the computer first begins to boot by pressing the F8 key.

■ Knowledge Assessment

Fill in the Blank

Complete the following sentences by writing the correct word or words in the blanks provided.

1. Windows backups are _____ by default.
2. To store a backup on a network location you need to provide a _____ or _____.
3. Windows backups can back up data from drives formatted as _____.
4. You must be logged on as a(n) _____ to back up a computer or data.
5. You can restore an earlier version of a file using _____.
6. Repair discs are used to repair missing or corrupt _____ files.
7. A new device driver has been added and the system is not responding. You boot to the Advanced Boot Options menu and choose either _____ or _____.
8. You have enabled boot logging and now need to find the text file that contains your driver information. You should look in the _____ folder for a file named ntbtdlog.txt.
9. The _____ service allows you to create restore points and backups of your system.
10. You can use a _____ to roll back your system to an earlier point in time.

Multiple Choice

Circle the letter or letters that corresponds to the best answer.

1. Backups of your data can be stored on which of the following? (Choose all that apply.)
 - a. CD/DVD
 - b. The same drive you are storing the backup on
 - c. USB
 - d. Hard drives
 - e. Network
 - f. Tape drives
2. When restoring a file using the Previous Versions feature, the permissions are set to which of the following?
 - a. Permissions of the person restoring the file
 - b. Full control to the person who is restoring the file
 - c. Original permissions
 - d. Whatever you set them to be
3. Which of the following can be included in a system image backup? (Choose all that apply.)
 - a. User data
 - b. The operating system
 - c. All drives
 - d. Data stored on a network server
4. What happens if you run out of disk space while creating a system image backup?
 - a. The process fails
 - b. You are prompted to delete files
 - c. Temporary files and folders are deleted to make room for the new system image
 - d. Older system images are deleted to make room for the new system images
5. Which of the following can be used to perform a system restore? (Choose all that apply.)
 - a. Command prompt
 - b. Recovery Control Panel
 - c. Preinstalled recovery options
 - d. System repair disc
6. You have performed a system restore from a restore point but your issue was not resolved. In fact, your computer is in even worse shape. Now the computer doesn't boot. Which of the following options are likely to restore the system? (Choose all that apply.)
 - a. Roll back to another restore point
 - b. Manually delete all files that changed
 - c. Undo the System Restore
 - d. Restart the machine
7. Which of the following methods can be used to access the recovery boot options? (Choose all that apply.)
 - a. Using Administrative Tools
 - b. Pressing F8 during the boot process
 - c. Using the Backup and Restore tool
 - d. Booting from a Windows Installation disc

8. Which of the following recovery boot options runs only on a domain controller and does nothing for Windows 7?
 - a. Safe Mode
 - b. Disable Driver Signature enforcement
 - c. Directory Services Restore Mode
 - d. Enable Low-resolution Video
9. When scheduling automatic backups in Windows Backup, which of the following can you customize? (Choose all that apply.)
 - a. Whether daily, weekly, or monthly
 - b. The day of the week
 - c. The time of the backup
 - d. Specific files to back up
10. Which recovery boot option should you avoid using if the computer you are attempting to boot has been infected by a virus?
 - a. Safe Mode
 - b. Safe Mode with Networking
 - c. Repair Your Computer
 - d. Safe Mode with Command Prompt

True / False

Circle T if the statement is true or F if the statement is false.

- | | | |
|---|---|---|
| T | F | 1. You can choose exactly what you want to back up to a folder. |
| T | F | 2. Windows Backup backs up the Recycle Bin just in case you want to restore previously deleted files. |
| T | F | 3. You can control how much hard drive space backups can use. |
| T | F | 4. You must be an administrator to restore your own data files. |
| T | F | 5. You can restore individual data files from a system image backup. |

■ Competency Assessment

Scenario 8-1: Scheduling File Backups

You provide technical support for PBJ&S, a small environmental consulting firm. Dina, the graphic artist, creates a lot of maps for client reports. Her Windows 7 Professional computer automatically backs up files every Sunday starting at 7:00 p.m. Dina reported recently that her computer was still backing up files when she arrived for work the last two Monday mornings. What can you do to help ensure that Dina's files are backed up by Monday morning?

Scenario 8-2: Installing from an Image

The owner of PBJ&S approved funds to purchase a new computer for Dina because an upgrade to her main mapping software requires more memory than her current computer's motherboard can handle. The new computer will be the same make and model but will have more memory and will have a much bigger hard disk. You also ordered a 1 terabyte external USB drive for backups. When the new computer arrives, how can you quickly get it up and running for Dina?

■ Proficiency Assessment

Scenario 8-3: Creating a System Repair Disc

Stanley works for your organization from his home office on a company-owned computer. He called your cell phone while you were at a restaurant having lunch. He said his computer has been having all kinds of problems lately and that it takes a long time for Windows to start. You suspect his Windows system files have become corrupt. Because you're away from the office, you can't set up a Remote Assistance session to troubleshoot Stanley's computer remotely. What do you advise Stanley to do?

Scenario 8-4: Resolving a Driver Problem Using Recovery Boot Options

You recently installed a new video adapter in Jeffrey's desktop computer using the driver supplied on the CD in the adapter packaging. When Windows starts, the words on the screen are unreadable. What is a possible solution for resolving the problem?